Engineering
Library

GENERAL LIBRARY
APR 29 1919
UNIV. OF MICH.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLV—No. 4

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

April, 1919

Published by the American Society of Civil Engineers at its Headquarters, 33 West Thirty-ninth Street, New York, the Fourth Wednesday of each Month, except June and July.

Copyrighted 1919, by the American Society of Civil Engineers.
Entered as Second-Class Matter, December 14th, 1896, at the Post Office at New York, N. Y., under the Act of March 3d, 1879.
Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3d, 1917, authorized on July 5th, 1918.
Subscription, $8 per annum.

Vol. XLV. APRIL, 1919. No. 4.

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852.

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

CONTENTS

	PAGE
Minutes of Meetings:	
Of the Society, March 19th and April 2d, 1919	409
Address by Nelson P. Lewis, M. Am. Soc. C. E	414
Items of Interest	418
Announcements:	
Hours during which the Reading Room is open	429
Future Meetings	429
Annual Convention	429
Roll of Honor	429
Engineering Societies Employment Bureau	430
Searches in the Library	430
Papers and Discussions	430
Contribution to *Proceedings* Requested	431
Local Associations of Members of the American Society of Civil Engineers	431
Privileges of Engineering Societies Extended to Members	436
Accessions to the Engineering Societies Library	437
Membership (Additions, Deaths)	440
Recent Engineering Articles of Interest	445

MINUTES OF MEETINGS OF THE SOCIETY

March 19th, 1919.—The meeting was called to order at 8.30 P. M.; Vice-President Nelson P. Lewis in the chair; Chas. Warren Hunt, Secretary; and present, also, 305 members and guests.

The meeting was devoted to a discussion of the New York and New Jersey Vehicular Tunnel. E. A. Byrne, M. Am. Soc. C. E., Chief Engineer of the Department of Plant and Structures of New York City, and also Consulting Engineer for the New York and New Jersey Tunnel Commission, opened the discussion, illustrating his remarks with lantern slides. The subject was discussed by Messrs. John F. O'Rourke, Paul G. Brown, J. V. Davies, James Forgie, Walter C. Parmley, T. Kennard Thomson, F. Lavis, Calvin Tomkins, Charles Evan Fowler, and George D. Snyder.

The Secretary announced the election of the following candidates on March 11th, 1919:

As Members

Henry Keepers Babbitt, Pompton Lakes, N. J.
Bion Angelo Bowman, Boston, Mass.
Harvey Courtright Brice, New Westminster, B. C., Canada
Edward Fairbank Carter, Melbourne, Victoria, Australia
Edward Charles Epple, Newark, N. J.
Frederick Anson Ericson, Nutley, N. J.
James Linwood Fawley, Philadelphia, Pa.
Ralph Freeman, London, England
Hans Jorgen Hansen, Chicago, Ill.
Thomas Arthur Jordan, Los Angeles, Cal.
Moses Leland Kingsley, Chicago, Ill.
Bernhard Martin Samuelson, Rangoon, India
Lewis Malcolm Stoddard, Jacksonville, Fla.
John Terrell Vawter, Philadelphia, Pa.
Wilmot Edgar Whittier, El Paso, Tex.
Roland Woodward, Jacksonville, Fla.

As Associate Members

Arthur Henry Abel, Portland, Ore.
Herbert Sidney Austin, Muskogee, Okla.
Charles Stewart Babb, Chicago, Ill.
Rufus McClellan Beanfield, Philadelphia, Pa.
Guy Bonney, Baltimore, Md.
Edmund Potts Burke, Detroit, Mich.
Dyer Butterfield, Chattanooga, Tenn.
Robert Stewart Calland, Yakima, Wash.
Charles Bloomfield Carman, Metuchen, N. J.
Jermain Chandler, Toledo, Ohio
Ronald Farquhar Chapman, Staines, England
Edgar Cockroft, San Diego, Cal.
Clyde Daniel Coffman, Washington, D. C.
John Lambert Collins, Lowell, Mass.
James Oscar Convill, Portland, Ore.
Daniel Chauncey Corwin, Norfolk, Va.
William Nathaniel Cramer, Chicago, Ill.
Hervey Kinch Doane, Miles City, Mont.
Anderson Edward Duckwall, Scottdale, Pa.
Frank Clarke Dugan, Washington, D. C.
Leyburn Grier Fishach, Sewickley, Pa.
Arnold Groothoff, Bandoeng, Java
Cuthbert Wead Haasis, Kensington, Ohio

Joseph Newcom Henderson, Kittanning, Pa.
Milton Hesselberger, Los Angeles, Cal.
William Clarence Hight, Walnut Ridge, Ark.
William Deloney Hull, Jacksonville, Fla.
Robert Olen Jameson, Dallas, Tex.
Charles Miller Jervis, Cupey, Oriente, Cuba
Lasley Lee, Tacoma, Wash.
Edward Searles Lindley, Bombay, India
Reynolds McHenry, San Francisco, Cal.
Leslie Ono Marden, Hampton, Va.
James Philip Nash, Austin, Tex.
Homer George Olmsted, Kansas City, Mo.
Wilbur Corthell Otis, Boston, Mass.
Frank Edison Richardson, Okmulgee, Okla.
Sanford Wales Sawin, Wilmington, Del.
Roscoe Lee Smith, Washington, D. C.
Lloyd Lawrence Stanley, Washington, D. C.
Warren Dudley Trask, Somerville, Mass.
James Tyler, Auckland, New Zealand
Arthur Tyndall, Trentham Military Camp, New Zealand
Cowles Mead Vaiden, Edgewood, Md.
William Edward Woolley, London, England
Thomas Parks Wright, Atlanta, Ga.

As Associates

Fred Rudolf Schmidt, Denver, Colo.

As Juniors

Bernard Edward Baer, Fort Leavenworth, Kans.
Moacyr Rodrigues Dias, São Paulo, Brazil
William Louis Hanselman, Montclair, N. J.
Isaac William Pugh, Baltimore, Md.
Albert Michael Tietzel, Johnstown, Pa.
Jorge Triana, Bogota, Colombia
Cornelius Van Eenenaam, Belleville, Ill.

The Secretary announced the transfer of the following candidates on March 11th, 1919:

From Associate Member to Member

Frederick Louis Bixby, Reno, Nev.
Haig Milton Boyajohn, Hog Island, Pa.
Harold Dearborn Comstock, Riverton, Wyo.
Gilbert Colfax Dobson, Washington, D. C.
Russell de Costa Greene, New York City

WINFRED MILLER KALLASCH, Chicago, Ill.
CHRISTOPHER GEORGE MORRISON, Juneau, Alaska
WILLIAM EDMUND PRICE, Camp Hancock, Ga.
WALTER JACKMAN RYAN, Camp A. A. Humphreys, Va.
WILLIAM HATFIELD SEARS, Chattanooga, Tenn.
RALPH GRAHAM SHANKLAND, Chicago, Ill.
MAURICE JOSEPH SULLIVAN, Houston, Tex.
CHARLES WINTHROP TARR, Windsor, Ont., Canada

FROM JUNIOR TO ASSOCIATE MEMBER

ROBERT SUMTER ANDERSON, Tulsa, Okla.
RAYMOND WENTHWORTH BROOKS, Kansas City, Mo.
EMERSON LAWRENCE CHANDLER, Dayton, Ohio
HORACE KELLOGG CORBIN, New York City
RALPH EDMUND DRAKE, Barberton, Ohio
SEARLE BROWN NEVIUS, Oakland, Cal.
KENNETH HAMMET TALBOT, Pittsburgh, Pa.
WILLIAM FLOYD WAY, Am. Exp. Forces, France
DAVID EWING WHITE, Chicago, Ill.
HAROLD CUSHING WHITMORE, Lynn, Mass.
JICK GAM WONG, Tsaoshih, China

The Secretary announced the following deaths:

RALPH HENRY BROWN, of Worcester, Mass., elected Member, June 7th, 1899; died February 22d, 1919.

JAMES NISBET HAZLEHURST, Maj., Engrs., U. S. A., of Atlanta, Ga., elected Member, October 4th, 1899; died in service (France), February 9th, 1919.

NORMAN MARSHALL HALCOMBE, Maj., Royal Flying Corps, British Army, of San Francisco, Cal., elected Junior, September 3d, 1907; Associate Member, May 2d, 1911; died in service (Port Said, Egypt), February 15th, 1919.

Adjourned.

April 2d, 1919.—The meeting was called to order at 8.30 P. M.; President F. S. Curtis in the chair; Chas. Warren Hunt, Secretary; and present, also, 130 members and guests.

The minutes of the meetings of February 19th and March 5th, 1919, were approved as printed in *Proceedings* for March, 1919.

Col. Dabney H. Maury, U. S. A., M. Am. Soc. C. E., Advisory Engineer on Water Supply, Construction Division, War Department, addressed the meeting on "Water Supply at Camps and Cantonments and Other Government Enterprises", illustrating his remarks with lantern slides.

The subject was discussed by Messrs. George W. Fuller, Paul H. Norcross, Clarence Goldsmith, T. Kennard Thomson, William P. Mason, J. Waldo Smith, E. T. Thurston, K. M. Boorman, W. J. Boucher, Morris Knowles, and Col. Maury.

The Secretary announced the following deaths:

HARVEY MOSHER GEER, of Ballston, N. Y., elected Member, June 6th, 1894; died March 18th, 1919.

GEORGE M. STEVENS, of Roxbury, Mass., elected Associate Member, November 6th, 1907; died September, 1918.

Adjourned.

THE ENGINEER IN HIS RELATION TO ADMINISTRATION

ADDRESS BY NELSON P. LEWIS, M. AM. SOC. C. E.,
AT AN ENGINEERS' SYMPOSIUM
HELD IN THE ENGINEERING SOCIETIES BUILDING,
NEW YORK CITY, MARCH 26TH, 1919.

What do we mean by administration? Heads of great industrial enterprises, transportation companies, and all other public service activities are required to perform functions which are largely administrative. Such places were once almost always filled by business men or lawyers; later, by men who had come up from the ranks, hard-headed men who had begun as boys and passed through the various branches or divisions of the work and had demonstrated qualities of leadership and executive capacity, but seldom were they men of technical education. During recent years we have seen such places more frequently filled by men who knew the science as well as the art of the business, keeping in mind the old distinction between the two, namely, that science teaches us to know and art to do. Men of the older type may have been able to do, but they frequently were more or less ignorant as to the why of the doing. They felt that they were able to secure all the technical advice they required and pay for it at the prevailing rate, often far less than it was worth. The man who knows the why of the doing and at the same time has the capacity to do and can make others realize that he both knows and can do, however, has a great advantage in the race for leadership in administrative work. There have been many conspicuous instances where spectacular success has been achieved by young men of this type, a success which would only have been gained under the former system through long service beginning at the very bottom and slowly mastering the details.

The term administration, as commonly used and understood, however, relates more particularly to public business, business of the city, state and nation. From this type of administration, the Engineer has been more completely excluded than in the case of industrial concerns or public service corporations. But what is the city or state but a public service corporation? In this exclusion the Engineer himself has appeared to acquiesce. To repeat words which heretofore I have used several times, the Engineer has been so long accustomed to doing things when he is told, as he is told, and because he is told by those whose function he has thought it to be to determine general plans and policies, that he is in no small degree responsible for the idea which has been generally prevalent, that the duty of the Engineer is simply to carry out the ideas and policies of others. But if it be admitted, as it must, that what is commonly called the administration of public business is largely the formulation and execution of engineer-

ing projects, why should not engineers themselves take a conspicuous part in their formulation as well as their execution?

There has been a growing appreciation of the importance of engineering advice in public business, and large technical staffs have been created for the study of plans and the execution of work, while engineering advice has been more and more sought and followed in the formulation of policies. And then there has often been a reaction, following the realization that the city, the state, or the nation is being governed to an unduly large degree by engineers and it has been thought wise and necessary to show them their places. But, after some unfortunate experiences and some bad bungling, resulting in considerable waste of public funds through the adoption of ill-considered and unrelated plans, a new cycle has been begun, and the engineers have again come to the front, and each time they have gone a little farther in the extent and importance of the service rendered.

The machinery of municipal administration, as prescribed by city charters, has usually been very cumbersome and ill adapted to meet emergent conditions. In 1900 the City of Galveston, Tex., was practically wrecked by a violent storm and tidal wave. The city was already in a bad financial condition, and the municipal government was unable to cope with the situation. The various departments and bureaus were paralyzed and, in order to meet existing conditions, a form of commission government was adopted under which the entire management of the city's affairs was placed in the hands of five men. One of these had the title of Mayor, although his duties and powers differed little from those of his colleagues, to each of whom specific functions were assigned. So successful was the plan that within a dozen years it had been adopted by about 400 cities and towns within the United States.

In 1913 the City of Dayton, Ohio, went a step farther and adopted what is known as the Commission-Manager plan. This also consisted of a commission of five citizens, elected at large, who constituted the governing body, but they appoint a chief administrative officer, designated as the City Manager. It will be noted that these two forward steps in municipal government were taken by cities which had suffered great disasters. It is true that at Dayton the idea had been under consideration before the flood which occurred about that time, but the ready adoption of the City Manager plan was probably due to the chaotic conditions resulting from the flood, when, as was the case at Galveston, the city government under its old charter provisions and limitations failed to function satisfactorily.

Thus was developed a field which the engineer with executive capacity is especially well qualified to fill. That this opinion is held by those responsible for the selection of the managing executives is evidenced by an examination of the list of City Managers who have been appointed. There is a City Managers' Association, and from its

Year Book and from information compiled by the *American City Magazine,* it appears that at the beginning of the present year 124 cities and towns in the United States were operating under some form of the City Manager plan. I have been able to secure information as to the previous experience and training of 88 of the managers, thus confirming the statement that a new and important opportunity has been opened to engineers. The classification is as follows:

50 professional engineers
9 merchants
6 minor city officials
5 general business
3 superintendents of construction
2 journalists
13 miscellaneous (These include a contractor, railroad president, railroad purchasing agent, public utility manager, professor of government, student of Training School for Public Service, office manager, league secretary, real estate dealer, lawyer, physician, broker, and plumber.)

It will be seen that where the City Manager plan has been adopted —and the idea has spread very rapidly—the trained engineer has moved up from the position of hired man to that of chief executive, and that the business man and merchant, so often regarded as the only men qualified by experience and training to manage the city's business, even when their numbers are combined, are a bad second, while the lawyer, once so commonly selected to conduct the public business, is, with the real estate man and the plumber, among those who "also ran".

It probably will be conceded that engineers have demonstrated their peculiar fitness for the positions which have been described, but the attention of those responsible for the selection of City Managers might well be called to their availability, and this can very properly be done.

Last year I was asked to serve as chairman of a committee to formulate for the National Municipal League a statement of the qualifications for City Manager and a questionnaire to be sent to all applicants. There were two other members of the committee, one a league secretary and one a director of governmental research. While some concessions had to be made to my colleagues, the statement of qualifications which was unanimously agreed on was as follows:

Experience.—Responsible charge of a municipal bureau or department or other actual experience in some branch of municipal work, such as executive, engineering or legal, or an equivalent experience in some administrative or engineering position.

Education.—Degree from an engineering school or college; legal training or special study of municipal government are desirable but not essential, provided the candidate shall have demonstrated his capacity by successful performance.

Personality.—Capacity to control subordinates and arouse in them enthusiasm for the work to be done; courtesy and tact in relations with the public; firmness, justice, and fairness in conducting the city's business.

Activities.—Organizations.—Statement indicating professional or civic organizations of which the applicant is a member, giving in the case of professional organizations the grade of membership, the date of admission, and the name of the secretary or other responsible official of the organization.

References.—Not less than three letters from responsible persons familiar with the practical experience of the applicant and setting forth in detail the nature of such experience, its extent, the degree of responsibility involved, and the period covered with dates. Not less than three references as to personal character.

While emphasis was laid on the desirability of engineering training, I would be disposed to go still farther, although admitting there are some others besides professional engineers who doubtless would make acceptable City Managers.

But what about the training of the Engineer to fit him for such positions? Business sense is certainly an essential qualification for success in such work as the management of a city, a public service corporation, or an industrial enterprise. Are the courses given in our engineering schools calculated to fit him for these most attractive fields of activity? We will be told that all the time of the student is required to enable him to cover the strictly technical curriculum, and that if such things as culture and business courses are to be added, the period of training will have to be lengthened or some of the technical courses will have to be curtailed or omitted. Perhaps this would not be as serious a loss as professional educators imagine, while it would broaden the student and might account for the difference between success and failure in administrative positions.

The subject assigned to me was the "Relation of the Engineer to Administration." Perhaps you will think that I have misread it and have discussed "The Engineer as an Administrator." This, however, appears to be a logical sequence of ideas. The concrete suggestions I would leave with you are two:

To those responsible for the selection of men to manage undertakings involving the planning and execution of engineering work, the trained engineer is the logical man for such management.

To those responsible for the early training of engineers, give them a knowledge of business and administrative methods as well as of purely technical subjects.

If the Engineer is to perform his full duty as a citizen, he should not content himself with effort in a restricted technical field, but should be prepared to assume the larger functions involved in the formulation and execution of comprehensive policies as well as plans.

ITEMS OF INTEREST

The Engineer as a Citizen

An Engineers' Symposium was held on the evening of March 26th, 1919, in the Auditorium of the Engineering Societies' Building, New York City, under the auspices of the Local Sections of the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, and the Society of Automotive Engineers. Fourteen other engineering organizations, including the American Society of Civil Engineers, were invited to participate. Gano Dunn, Past-President, American Institute of Electrical Engineers, presided. The Auditorium was comfortably filled.

The programme comprised five addresses, all of which were read from manuscript and occupied about 20 min. each in the reading. A general discussion by several of the audience followed.

The first address was by Philip N. Moore, Past-President, American Institute of Mining and Metallurgical Engineers, on "The Civic Responsibilities of the Engineer", during the course of which he said:

"Given like heredity and culture, using the word as distinguished from technical training, there is no inherent reason why an engineer should react differently from any other citizen to the patriotic call or civic responsibility. But, unfortunately, things have combined to leave him too often unwanted and uncalled. What are these things?

"First: Lack of local attachments. The engineer, more than the members of almost any other calling, is always working himself out of a job. With few exceptions, his tasks are scattered country-wide, or world-wide, and mostly are those of construction, which, completed, he goes his way to build again. This is peculiarly true of the civil engineer; it is so of the miner—the sailor of the land. The task of building, always under pressure, is demanding. He works under strain, he has little time to foregather with his fellows, or to think in terms of political or national interest and service, save as great emergencies come, like that of the late war, which take us all from our wonted callings and project us into the vortex of unselfish devotion to national interests. Without local responsibilities, a man feels little sense of civic duty, and finds less opportunity for participation in national questions. Our local attachments are naturally to us the dearest. * * *

"Again, the fact that so large a proportion of the total body of engineers serves the great business consolidations (many of which have interests adverse to the public or by their very size induce criticism and political attack, so that in self defense they think they must hold their staffs to strict neutrality on all public questions), is another reason why so many of the very highest class engineers have perforce been held from civic activity even had they desired otherwise.

"Again, the engineer's training, too often being merely technical, has failed to teach that the greatest task of all is the ability to persuade men, and unwillingness or incapacity to enter public discussions, either through modesty or lack of readiness, has held him back. False

professional pride and the same indifference which holds back many high-class men through unwillingness to mingle with and rub shoulders against the great majority, have deterred him.

"Possibly the past habits of the great organizations which the engineer forms (and which voice his profession) to hold themselves aloof from political affairs as collectively unethical, is another cause.

"These are some of the reasons. Every man before me this evening may have in his innermost heart others equally potent, but the fact remains we have left undone the things which we should have done."

Calvert Townley, Past-Vice-President, American Institute of Electrical Engineers, then read his address on "The Relation of the Engineer to Legislation." After describing various efforts made by committees of engineering societies to assist in forming legislative policies, Mr. Townley closed his address as follows:

"I will feel myself very fortunate if I can interest you to consider what should be the limiting policy of engineers with respect to legislation. It has been my lot to have to do with this question for a number of years and while I have earnestly sought to get the opinions of my engineering friends and to act upon them, I confess that I do not know what engineers want and therefore what our policy should actually be. Of course we believe in ourselves. We believe that an engineer's training, designed as it is to make him think clearly, to deal with essential facts, and to arrive at logical conclusions regardless of outside influence, peculiarly qualifies him to express opinions on legislative as on other subjects, but we shall have to choose which of two places to occupy. Shall we be a united body of technical men speaking only with deliberation and a certain amount of proper dignity regarding subjects which the public recognizes us as qualified to speak upon or shall we be as a body of somewhere from 30 000 to 100 000 citizens who have a common interest and desire to exert political pressure by reason of our numbers?

"I would like to think that we could combine these two positions, but my logic tells me that we cannot. We cannot be a technical organization and a political party at the same time. It should be borne in mind also that sustained effort is what counts. Not much can be accomplished by sitting solemnly in a meeting and passing resolutions. You must get out and hustle—and keep hustling. I assume that no engineer wants to start something which he cannot finish; therefore, an undertaking such as that of convincing our lawmakers to do as we say, should be entered upon only with a full realization of what it means in the way of an outlay of time and also of money. Personally, I have a very strong conviction on one point. It seems obvious that if we dilute our efforts to cover a wide field they must inevitably lose their intensive effect. We should not try to influence legislation which concerns us only as citizens, but if we undertake the task at all, we should concentrate our efforts on certain specific lines and thereby stand a better chance of having them prove effective."

"The Relation of the Engineer to Administration" was the title on the programme of the address by Nelson P. Lewis, Vice-President,

American Society of Civil Engineers. The address will be found on page 414 of this issue of *Proceedings*.

Spencer Miller, Vice-President, American Society of Mechanical Engineers, addressed the meeting on "The Relation of the Engineer to Public Opinion." During the course of his address, Mr. Miller said:

"The engineer is assuming an ever larger position in public life, and, in spite of himself, he is at the very center of life. The more we realize this great truth, the more seriously do we contemplate our responsibilities. This thought fills some with pride and others with humility. Eliminate the engineer from the world, and civilization would soon pass through other 'Dark Ages' comparable with savagery and barbarism. It is clear, therefore, that we, individually and collectively, should make every possible effort to mould public opinion in the right direction, especially at present to counteract the propaganda of those stirring up class hatred. Even to-day the engineer stands, with all law-abiding citizens, facing the dark cloud of Bolshevism—not timidly, not indifferently, but in full strength, courage and faith, that Bolshevism cannot survive in America. Look at Engineer Hoover shooting at Bolshevism. The United States will stand firmly against Bolshevism with bullets and bayonets if necessary, because Bolshevism stands squarely against the code of morals upon which our civilization was founded."

The concluding address was made by Comfort A. Adams, President, American Institute of Electrical Engineers, on "The Relation of the Engineer to Production and Distribution." The following paragraphs formed a part of his remarks:

"Two of three of the speakers have mentioned engineering education, and the last speaker referred to matters of character and spirit. I have been concerned with engineering education for so long that I almost hate to count the years, and certain things during those years have been impressed very vigorously on my mind. One of them is this: It is not the curriculum and the subjects that are taught that count, it is absolutely and solely the way in which they are taught. You can put more spirit and more character-building and more general preparation for citizenship into a course in dynamo design than you will ordinarily be able to find in courses in economics or history or government. That is really a conviction so strong in my mind that I am not concerned with the subjects that are taught, but vastly with the men who teach them. * * *

"Finally, may I for a moment step outside of the strict confines of my subject, and add a plea that we engineers whose normal work is so much concerned with organization in industry, accept as a part of our responsibility as citizens the broader problems relating to the organization of society, that we face the facts fairly and prepare to take an intelligent step forward, rather than wait until the great Tank of Discontent, tired of waiting for us to move, has gained momentum enough to crush us and all that we represent."

Broader Commercial Education Recommended for Engineers

The Commissioner of Education, through Dr. Glen Levin Swiggett, Specialist in Commercial Education, invited a committee composed of administrative professors of engineering and commerce from representative higher institutions of learning and delegates from the four National Engineering Societies, to meet in Washington, D. C., at the New Willard Hotel, on March 31st, 1919, to discuss ways and means for the broader education of engineers along commercial lines. There were present twelve prominent educators from well-known technical schools and the following delegates from the National Engineering Societies: American Society of Civil Engineers, Francis R. Weller; American Institute of Mining and Metallurgical Engineers, H. Foster Bain; American Society of Mechanical Engineers, R. L. Sackett; and American Institute of Electrical Engineers, Francis C. Pratt.

The Society for the Promotion of Engineering Education was represented by Dean W. E. Mott, School of Applied Science, Carnegie Institute of Technology. Dr. Glen Levin Swiggett represented the Committee of Fifteen on Educational Preparation for Foreign Service.

It was understood in advance that the sending of delegates by the four National Engineering Societies did not commit them to an endorsement of any action taken at the conference.

After a general discussion, through the better part of two sessions, it was found that the Committee was of the unanimous opinion that certain business courses should be added to all engineering courses in technical schools, in order to give the engineering graduate some knowledge of business, particularly emphasizing the questions of cost accounting, general economics, specifications and contracts, and business organization. The following propositions were submitted for consideration by the Bureau of Education:

First.—That a minimum number of hours in business training, to be determined by the Committee, be required in all engineering courses;

Second.—That a curriculum providing for a minimum of fifteen to thirty units in business economics be incorporated in all engineering courses and offered on an elective basis;

Third.—That a curriculum in commercial or industrial engineering, permitting full and proper emphasis on engineering subjects, be offered in the School of Commerce with degree to be given in that school;

Fourth.—That a five-year combined engineering and commercial course be prepared.

The Committee, after full discussion, decided that no action should be taken at this time on the third and fourth propositions, and, therefore, they approved the following recommendations, which will be considered by a general conference, to be held in the near future, of

representatives invited from the various engineering colleges and schools throughout the country:

Recommendation One.—That from 12 to 18 semester hours be required of all engineering students covering the following subjects:

1. General Economics.
2. Cost Accounting.
3. Business Organization.
4. Business Law.

Recommendation Two.—That for engineering schools desiring to extend further the commercial or industrial aspects of engineering, the following subjects are recommended as electives:

1. Labor and Employment.
2. Corporation Management and Finance.
3. Statistics.
4. Marketing.
5. Scientific Management.
6. Psychology.
7. Transportation.
8. Political Science.

Recommendation Three.—That the economic phases of engineering be emphasized in engineering instruction wherever possible.

General Engineering Congress, Java, 1920

The *Proceedings* for August, 1918 (page 610) contained an item relating to the Engineering Congress to be held in Java, and additional information was printed in the *Proceedings* for December, 1918. In a communication from the Chairman of the Executive Committee of the Congress, dated January 21st, 1919, it is stated that the date for holding the Congress has been advanced to May, 1920, this being due to the receipt of information from various engineers and also from committees of societies, etc., that it would be impossible to go to Java or to send delegates in September, 1919 (the date previously set), owing to traveling and other conditions imposed by the war.

Engineers are invited to take part in the Congress by being present or by contributing papers and discussions on engineering subjects. Papers should be in the hands of the Executive Committee on or before June 1st, 1919. A few bulletins and circulars relative to the Congress have been received, and have been placed in the Reading-Room of the Society where those who are interested can obtain them.

More Rapid Topographic Mapping Urged by Engineering Council

The advisability of the rapid completion of a topographic map of the United States was demonstrated during the World War. It is also now asserted that if the topographic survey of the country proceeds

at a rate no faster than that prescribed by Congress heretofore, a generation or more will pass before the work is completed.

With a view to assist in speeding up this important undertaking M. O. Leighton, M. Am. Soc. C. E., Chairman of the National Service Committee of Engineering Council, has sent the following letter to the Secretary of the Interior:

"WASHINGTON, D. C., MARCH 25TH, 1919.

"THE HONORABLE,
"THE SECRETARY OF THE INTERIOR,
"Washington, D. C.

"MY DEAR MR. SECRETARY:—It has become apparent to engineers, geologists, and others engaged, officially or otherwise, in development work that the Geological Survey should be granted a more liberal appropriation for topographic mapping. The demand for a complete topographic map of the United States is the result of dearly bought experience, and a realization that such a map is an essential part of that programme of development to which our country must resort if it is to respond to its own internal needs and to new world demands. Especially in the past two or three years has there been a wide acceptance of new ideas with respect to fundamental map necessities. The topographic map which was once considered a scientific convenience or an engineering luxury, is now recognized as an essential part of good engineering and a prime factor in the economic development of natural resources. Contributing largely to this new appreciation of good maps are the experiences of the Federal Government itself in the many activities that grew out of the war programme.

"It would require much space to review in any worthy way the needs for and the uses of a complete topographic map. We mention a few merely in order to assert that any one of them is of sufficient importance to warrant all the expenditures necessary to make a complete map. It is obvious that the maps are essential as a basis for National defense, and hardly second in importance is the need of them in connection with the enormous road building programme upon which the Government has entered. The two objects are largely interwoven. Did we have a complete topographic map of the country for use in the execution of our National road programme alone, the cash saving would exceed the cost of the map. The Federal policy of arid-land and swamp-land reclamation is also responsible for increased appreciation of map necessities, and not less important is the matter of power supply. The Boston-Washington power survey, which you advocated so ably before the Appropriations Committee of the 65th Congress, is merely one of many examples where a complete topographic map becomes a fundamental necessity. In the fields of mining and geology it has long been known that a map must be the forerunner of all productive work done on present-day scale. Finally, in the development and extension of railway systems, which forms one of the most important factors in our National progress, the topographic map has become the greatest single aid, time-saver, and means of economy that has been placed in the hands of the constructor. All of these uses and many others of similar purport are of first-class economic importance. The engineers of the country keenly appreciate these facts, and they

are earnestly asserting that a topographic map of the United States should be completed at as early a date as may be found consistent with accurate accomplishment.

"We might use much space in discussion of political and social necessities of topographic mapping, from either of which there could be derived adequate reasons for a most liberal topographic programme on the part of the Federal Government. Engineering Council, however, prefers to confine its consideration to the purely engineering features, leaving the discussion of other phases to other and more appropriate agencies.

"Information received from the Director of the Geological Survey gives assurance that there are trained topographers available to accomplish topographic work during the next fiscal year equivalent to the expenditure of $1 000 000. In the opinion of engineering officials, State geologists, and others who are well informed on the subject, the States of the Union are, in a majority of instances, ready and willing to co-operate more liberally than they have in the past. It is believed that the several States can be induced to make appropriations aggregating $500 000 for the next fiscal year. This, under the million-dollar programme, would leave the sum of $500 000 to be appropriated by Congress. It seems to us reasonable and wise to advocate such an appropriation for the next fiscal year. Present needs of the Government alone require a sum largely in excess of $500 000 for mapping necessary to the projects and investigations already authorized by Congress—projects which are in fact public work in progress. Detail facts concerning this are already familiar to you. It is respectfully urged that you consider the advisability of increasing the Geological Survey estimate for topography that you will present to the 66th Congress, from $350 000 to $500 000.

"The engineers of the country would emphasize the fact that the lack of a complete topographic map is retarding Government work and increasing the expense thereof to such an extent that the aggregate loss to the United States is many times greater than the amount necessary to make the map. There can be no question that similar losses are accruing to State and local governments for the same reason. Precise figures on this point cannot be cited without extended investigation, but we are none the less confident in asserting the conclusion. During past years the Geological Survey has covered a surprising amount of territory with the small appropriations made available to it, but it is evident that, at the present rate of progress, many years will elapse before the country is provided with a complete map. We believe that the projects and activities that must be sponsored by the present generation are of sufficient importance to demand that the present generation as well as future ones shall have the benefit of topography.

"Kindly be assured that if you find it possible to recommend to the 66th Congress an appropriation of $500 000 for the above recommended work in the next fiscal year, you will find practically unanimous support among American engineers and others who are well informed as to the necessities.

"Very respectfully,

"M. O. LEIGHTON
"Chairman National Service Committee."

Membership of American Society of Civil Engineers Passes 9 000

On March 24th, 1919, Mr. Lewis Malcolm Stoddard qualified as a Member of the American Society of Civil Engineers, and this brought the total membership of the Society up to 9 000.

"Tentative Standard" Tests Adopted by the American Engineering Standards Committee

At a meeting of the American Engineering Standards Committee held on March 1st, 1919, Chairman Comfort A. Adams announced the result of a letter-ballot on the two standards presented by the American Society for Testing Materials, at the February 1st, 1919, meeting of the Committee, *viz.:*

1—A. S. T. M. Standard Specifications and Tests for Portland Cement.

2—A. S. T. M. Standard Specifications for Fire Tests of Materials and Construction.

As there were 13 affirmative votes cast, and none in the negative, these two standards become "Tentative Standards" of the American Engineering Standards Committee.

Industrial Board of the Department of Commerce

The Council of National Defense is authorized to announce the creation, by the Hon. William C. Redfield, of "The Industrial Board of the Department of Commerce." Under the approval already given by the President to the Secretary of Commerce, this Board will be charged with the stabilization of prices for basic materials in such a way as to create a firm foundation on which the consumer can base his future purchases and the producer can form necessary production cost estimates. Its programme will be supported by the Council of National Defense.

This Board will consist of six carefully chosen men. The full personnel will be announced as soon as acceptances have been obtained. Already it is assured that the Chairman will be George N. Peek, of Moline, Ill., formerly Vice-Chairman of the War Industries Board. Hugh Frayne, the labor representative on the Board, was also on the War Industries Board as the representative of Labor, and the official representative of the Government in the new organization will be Thomas C. Powell, Director of Capital Expenditure of the Railroad Administration.

Through proper investigation and stabilization it is expected that the foundation can be laid for the resumption of American business and for furnishing employment to returning soldiers and sailors, through Government purchases, the publication of fair price lists, and the co-

operation of the producer. To obtain this co-operation, it is planned that the Board shall call the leaders of industry into consultation. The first of these conferences will be with representatives of industries producing basic materials, such as iron, steel, lumber, textiles, cement, copper, brick, etc.

The Board will endeavor to interchange views with these representatives of industry in the fullest and freest manner possible. If these conferences result in a general agreement among the important basic industries as to proper prices and bases for prices at which sales will be made, and this agreement is approved by the Board, it is believed that the announcement of this fact will induce the nation to feel justified in properly beginning a buying programme.

Engineers' Registration Act for Oregon

The *Proceedings* for March, 1919 (pages 304-310), contained a copy of the Engineers' Registration Act for Oregon. The Act, as printed in *Proceedings,* has been amended as follows: On page 306, line 1, after the word "governor" insert "Said Board to consist of two civil engineers, two mechanical engineers, one electrical engineer, two hydraulic engineers, and two mining engineers;" on page 307, line 14 from the bottom, strike out the word "four" and insert the word "two" in lieu thereof. The Act, with these amendments, has received the approval of the Governor.*

Cornell Library Contains Many Original Data

At Cornell University there is an unwritten law that an alumnus who engages in any new or original engineering work or investigation shall make a report on it to the Cornell Library. The result is that the Library of the University contains a great mass of information, as the alumni are said generally to live up to the unwritten law.

Poles Preparing Commercial Relations with United States

Representatives of technical and commercial interests in the United States of Polish blood have organized the Society of Polish Engineers and Businessmen in America, to work in conjunction with the Commercial and Industrial Bureau of the Polish National Department, 33 West 42d Street, New York City, in developing closer relations between the new Republic of Poland and the United States.

* The statement with regard to the partial approval, by the Portland, Oregon, Association of Members of the American Society of Civil Engineers, of the Engineers Registration Act, which was published in the March, 1919, *Proceedings*, page 304, having been questioned by that Association, it should be stated that this news item was taken *verbatim* from a letter written by Roy A. Klein, Assoc. M. Am. Soc. C. E.—*Secretary.*

The organization is headed by Ralph Modjeski, M. Am. Soc. C. E., as Honorary President. Steven de Csesznak is President. The Society's headquarters are in the Engineering Societies' Building, 33 West 39th Street, New York City. Its functions are to associate Poles in America for the purpose of co-operating in the technical and commercial fields, and to do preparatory work toward bringing about closer economical relations between the United States and Poland.

Poland is the first of the new European States to establish in the United States an equipped commercial bureau for the development of trade relations between the two countries. The Polish National Department at Chicago, of which I. J. Paderewski, Premier of Poland, is Honorary President, and which comprises an executive council of the Polish societies in the United States, has opened a Commercial and Industrial Bureau in the Aeolian Building, 33 West 42d Street, New York City. This Bureau will endeavor to furnish American manufacturers and exporters with detailed data relative to the needs of Poland and later to arrange loans and credits to meet such purchases of raw and manufactured materials as Polish merchants and the Government of Poland may make here.

Mr. George Fudakowski, for many years an executive with the Westinghouse Electric and Manufacturing Company in Paris, Warsaw, and Petrograd, and recently associated with Mr. Paderewski in the relief work for Poland in the United States, has been named Director of the newly established Bureau. Through his organization, he is in official contact with Polish Government authorities in Paris, London, and Warsaw.

Road Building in Pennsylvania

Recent press dispatches from Harrisburg, Pa., state that approximately 35 000 men will be employed during 1919 on road building in Pennsylvania. It is asserted that the State Highway Department plans to construct 600 miles of highway and that expenditures on road building during the next four years will approximate $100 000 000. A bill authorizing the State to issue bonds up to $50 000 000 is now going through the Legislature. Counties, it is expected, will spend many millions more for road building.

Highway Construction in Texas

George A. Duren, State Highway Engineer of Texas, announces that the State is about to undertake a programme of highway construction of considerable magnitude. In order to achieve co-operation between the Highway Department's Engineers and the various County Engineers to govern the actual construction work, the Engineering Department of the University of Texas and the State Highway Depart-

ment conducted at the University a two weeks' course in Highway Construction and Maintenance. All County Engineers in the State were invited to attend this course which was held from March 31st to April 12th, 1919, inclusive, and which concluded with an examination on the subjects discussed.

New Chairman of Interstate Commerce Commission

In accordance with the custom of the Interstate Commerce Commission of rotating its members in the presiding office in the order of seniority, Clyde B. Aitchison has been elected Chairman of the Commission. He was appointed a member of the body on September 29th, 1917, and his term expires in 1921.

French Tunnel Commission is at Work

Albert Claveille, French Minister of Public Works, is presiding over meetings now being held by the commission appointed to study the subject of the Channel Tunnel. It is expected that definite plans for a Franco-British agreement will be developed.

Americans on Siberian Railway Boards

The State Department has been notified of the personnel of the Technical and Military Boards which have undertaken to rehabilitate the Siberian Railway. The American members are Charles H. Smith on the Inter-Allied Committee, John F. Stevens, M. Am. Soc. C. E., President of the Technical Commission, and Col. Hugh J. Gallagher, U. S. A., on the Military Board.

$500 000 for Research Work

The Rockefeller Foundation announced on March 30th, 1919, that it had appropriated $500 000 to support over a five-year period a research fellowship, in co-operation with the National Research Council, in the promotion of fundamental research in physics and chemistry. The funds and the details of the plan are to be administered by the Council. This action, according to President George E. Vincent of the Foundation, has resulted from a study of the best method of developing "pure research" aimed primarily at the discovery and understanding of basic principles, such as, for example, those governing light, stress being laid on the fundamental principles and not on the human inventions resulting therefrom.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, New Year's Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

FUTURE MEETINGS

May 7th, 1919.—8.30 P. M.—A regular business meeting will be held, and a paper by A. F. Parker, M. Am. Soc. C. E., entitled "The East Canyon Creek Dam", will be presented for discussion.

This paper was printed in *Proceedings* for March, 1919.

May 21st, 1919.—8.30 P. M.—The arrangements for this meeting are in the hands of the New York Meetings Committee, and the programme for the evening will be announced later.

ANNUAL CONVENTION

The Forty-ninth Annual Convention of the Society will be held in the "Twin Cities" of St. Paul and Minneapolis, Minn., from June 17th to 20th, 1919, inclusive.

The general arrangements for the Convention are in the hands of the following Committees:

Committee of the Board of Direction

W. L. DARLING, *Chairman*

E. E. WALL — CHAS. WARREN HUNT

Local Committee

R. D. THOMAS, *Chairman*

W. C. ARMSTRONG	W. H. HOYT
F. H. BASS	W. N. JONES
R. B. C. BEMENT	F. C. SHENEHON
F. W. CAPPELEN	H. E. STEVENS
OSCAR CLAUSSEN	P. E. THIAN
WILLIAM DE LA BARRE	W. J. WALKER
F. E. HOUSE	G. L. WILSON

L. P. WOLFF

A circular giving information as to the general programme, transportation, hotel rates, etc., will be issued later.

ROLL OF HONOR

Now that the war is over, the monthly publication in *Proceedings* of the Roll of Honor has been discontinued. It is planned to publish later for permanent record a list of all the members of the American Society of Civil Engineers whose names have appeared on this list.

ENGINEERING SOCIETIES EMPLOYMENT BUREAU

Engineering Societies Employment Bureau, established December 1st, 1918, as an activity of Engineering Council, is managed by a board made up of the Secretaries of the four Founder Societies, funds for its maintenance being provided by these Societies. The Bureau already is co-operating with engineering organizations in all parts of the country and with the Professional Section of the United States Employment Bureau. It is desirous of increasing such co-operation by working with local engineering associations and clubs. The work of the Bureau since its inception has been largely in the line of securing employment for men retiring from government war service. Members of the American Society of Civil Engineers who desire to register with this Bureau should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Employment Bureau, 16th Floor, Engineering Societies Building, 29 West 39th Street, New York City.

SEARCHES IN THE LIBRARY

As the Library of the American Society of Civil Engineers has been merged in the Engineering Societies Library, requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service. For a more comprehensive statement in regard to this matter, see *Proceedings* for March, 1919.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be pub-

lished in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 35 of the Year Book for 1919.

CONTRIBUTIONS TO PROCEEDINGS REQUESTED BY PUBLICATION COMMITTEE

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings*. This is intended to cover letters or suggestions from our membership covering matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association, Organized 1905.

E. J. Schneider, President; Nathan A. Bowers, Secretary-Treasurer, 502 Rialto Building, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Engineers' Club, 57 Post Street, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at noon, every Wednesday, at the Engineers' Club, where special tables are reserved for members and guests of the Association.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

Colorado Association, Organized 1908.

L. R. Hinman, President; A. N. Miller, Secretary-Treasurer, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesday at 12.30 P. M., at Daniels and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

Atlanta Association, Organized 1912.

T. P. Branch, President; J. T. Wardlaw, Secretary-Treasurer, 1530 Healey Bldg., Atlanta, Ga.

Informal luncheons are held for members of the Association on the last Monday of each month, at 12.30 P. M. The place is not fixed, but this information will be furnished on application to the Secretary.

Baltimore Association, Organized 1914.

H. G. Perring, President; Charles J. Tilden, Secretary-Treasurer, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

F. D. Richards, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Detroit Association, Organized 1916.

T. A. Leisen, President; Clarence W. Hubbell, Secretary, 2348 Penobscot Building, Detroit, Mich.

The regular meetings of the Association are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Association, Organized 1916.

A. P. Davis, President; John C. Hoyt, Secretary-Treasurer, U. S. Geological Survey, Washington, D. C.

Duluth Association, Organized 1917.

W. B. Patton, President; Walter G. Zimmermann, Secretary, Wolvin Building, Duluth, Minn.

The regular meetings of the Association are held at noon on the third Monday of each month (usually at the Kitchi Gammi Club), with luncheon, followed by a short business session and the reading of papers. Visiting members of the American Society of Civil Engineers can secure from the Secretary definite information relative to the meetings, at which they will be welcomed. The Annual Meeting is held on the third Monday in May.

(Abstract of Minutes of Meeting)

March 24th, 1919.—The meeting was called to order at the Kitchi Gammi Club; President W. B. Patton in the chair; Walter G. Zimmermann, Secretary; and present also, 23 members and 3 guests.

The project for the formation of an engineering library received encouragement through the receipt of an offer from the City Librarian to provide space in the City Library for the use of the Duluth Engineers Club and the Duluth Association.

Messrs. Hutchinson, Christie, and Ash were appointed a Library Committee, and to this Committee was referred the investigation of the Clarence Coleman Library, with a view to its purchase as a nucleus of the new library.

Mr. Hoyt reported briefly on the Annual Convention of the Society to be held at the Twin Cities probably from June 17th to 20th, 1919. The plan for the Duluth visit is: to leave Minneapolis by special train on the afternoon of June 19th, arriving at Duluth that evening, and leaving for the Mesaba Range on the morning of June 20th, touring the Range by automobiles and returning to Duluth that evening *via* Two Harbors. The Duluth programme is being prepared by the Entertainment Committee composed of Messrs. Stack, Lewis, and Pickles.

The President introduced Col. Francis A. Pope, who gave a most interesting talk on his experiences in the service of the American Expeditionary Forces in France.

The President announced that Mr. E. R. Lewis, a Director of the Association, had associated himself with the *Railway Age* at Chicago, where he is to serve on the editorial staff on special work, and expected to leave Duluth in a few days. The President expressed sincere regrets at Mr. Lewis' leaving, calling attention to the fact that, from the start, he had been one of the loyal members, that he had never spared time or effort in promoting the welfare of the Association, and that the membership was greatly indebted to him for the interest he had always taken in the organization.

Mr. Lewis responded, expressing his regrets at being obliged to sever his connection with the Association, but hoping to visit his Duluth friends occasionally in the future.

Adjourned.

Illinois Association, Organized 1916.

H. J. Burt, President; Edgar S. Nethercut, Secretary-Treasurer, 1735 Monadnock Blk., Chicago, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Louisiana Association, Organized 1914.

Arsène Perrilliat, President; Eugene F. Delery, Secretary, 2007 Laharpe Street, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nebraska Association, Organized 1917.

Adna Dobson, President; Homer V. Knouse, Secretary-Treasurer, 109 City Hall, Omaha, Nebr.

Regular meetings of the Association are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

Northwestern Association, Organized 1914.

Ralph D. Thomas, President; W. N. Jones, Secretary, City Engineer's Office, City Hall, Minneapolis, Minn.

The meetings of the Association are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month. Information as to the time and place of such meetings will be furnished on application to the Secretary.

Philadelphia Association, Organized 1913.

F. Herbert Snow, President; Henry T. Shelley, Secretary, 416 City Hall, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting.

Pittsburgh Association, Organized 1917.

Robert A. Cummings, President; Nathan Schein, Secretary-Treasurer, 1510 Carson Street, Pittsburgh, Pa.

The Annual Meeting of the Association is held on the first Monday in October. The time and place of other meetings are not fixed, but this information will be furnished on application to the Secretary.

(Abstract of Minutes of Meeting)

February 28th, 1919.—The meeting was called to order at the Fort Pitt Hotel; President R. A. Cummings in the chair; Nathan Schein, Secretary; and present, also, 45 members.

George W. Fuller, M. Am. Soc. C. E., a member of the American Delegation to the Engineering Congress in Paris, addressed the Association on his experiences and observations in France.

The Chairmen of the four Sub-Committees on Development presented their reports, and these were discussed fully by those present.

Adjourned.

Portland, Ore., Association, Organized 1913.

E. Burslem Thomson, President; C. P. Keyser, Secretary, 318 City Hall, Portland, Ore.

St. Louis Association, Organized 1888 (Constitution Approved by Board, 1914).

J. A. Ockerson, President; C. W. S. Sammelman, Secretary-Treasurer, 300 City Hall, St. Louis, Mo.

The Annual Meeting of the Association, for the election of officers and for the transaction of business, is held on the fourth Monday in November. Two meetings each year, for the presentation and discussion of technical papers, are held in the Auditorium of the Engineers Club of St. Louis and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

San Diego Association, Organized 1915.

W. C. Earle, President; Ralph Wueste, Secretary-Treasurer, Bonita, Cal.

Seattle Association, Organized 1913.

L. M. Grant, President; Phil A. Franklin, Secretary, 1409 East 65th St., Seattle, Wash.

The regular meetings of the Association, with luncheon, are held at the Engineers' Club, Arctic Building, Third Avenue and Cherry Street, at 12.15 P. M., on the last Monday of each month.

Special evening meetings are held from time to time for the purpose of discussing important topics, and information concerning these meetings may be had by addressing the Secretary. All members in any grade of the American Society of Civil Engineers are cordially invited to attend the meetings when in the vicinity, and, if located in this District for any length of time, their membership in the Association will be appreciated.

Southern California Association, Organized 1914.

George G. Anderson, President; Floyd G. Dessery, Secretary, 514 Central Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular monthly meetings on the second Wednesday of each month, the December meeting being the Annual Meeting.

Informal luncheons in connection with the Joint Technical Societies of Los Angeles are held at 12.15 P. M. every Thursday at the Broadway Department Store Café.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

(Abstract of Minutes of Meeting)

March 12th, 1919. (Special Meeting).—The meeting was called to order at Christopher's Café: President G. G. Anderson in the chair; F. G. Dessery, Secretary; and present, also, 39 members and 25 guests.

The minutes of the meeting of February 12th, 1919, were read and approved.

Mr. John W. Alvord, Member of the Board of Direction of the Society, and Mr. Calvin W. Rice, Secretary of the American Society of Mechanical Engineers, were present and addressed the meeting briefly.

The resolutions adopted by the St. Louis Association on January 28th, 1919, relative to the financial support of Engineering Council, were read, and also correspondence between Secretary Dessery and Alfred D. Flinn, Secretary of Engineering Council. Following statements by Directors Alvord and Hawgood, it was decided that no action in the matter was required, either by Local Associations or individual members.

The resolutions adopted by the Philadelphia Association on February 24th, by the Cleveland Association on February 25th, by the Texas

Association on February 24th, and a letter from Mr. W. H. Hoyt, of Duluth, Minn., relative to the Committee on Development, were read, and, after brief discussion, it was decided to withhold the appointment of a committee within the Association for the present. President Anderson, the Association's representative on the Committee on Development, announced that such a committee would be appointed when occasion required it.

The Secretary announced the addition of 13 members to the roll, and 1 resignation.

The topic for the meeting was "Flood Control in Southern California," a symposium to extend over a number of meetings.

President Anderson introduced the subject, giving a clear and succinct review of the problems involved and to be considered. This was prefaced by a few remarks on the purpose of the Programme Committee in arranging for such symposia, which was, in effect, to stimulate the membership by more frequent intercourse, by the technical presentation of local engineering problems, and by consideration of the interest of the community.

Mr. F. H. Olmsted presented a comprehensive historical sketch, especially directed to the conditions in Los Angeles County. Mr. A. L. Sonderegger discussed at length the physiography of the region as pertaining to flood control problems.

The discussion is to be continued at the ensuing monthly meetings.

Adjourned.

Spokane Association, Organized 1914.

Peter Mogensen, President; Charles E. Davis, Secretary, City Engineer's Office, Spokane, Wash.

The regular meetings of the Association are held on the second Friday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Visiting members are invited to attend the meetings.

Texas Association, Organized 1913.

R. J. Potts, President; J. H. Brillhart, Secretary, Care, Mosher Mfg. Co., Dallas, Tex.

Utah Association, Organized 1916.

A. B. Villadsen, President, 304 Dooly Block, Salt Lake City, Utah.

The Annual Meeting of the Association is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the President.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcome in the Reading Rooms and at the meetings of many engineering societies in all parts of the world. A list of such societies will be found on pages 41 and 42 of the Year Book of the Society for 1919.

ACCESSIONS TO THE ENGINEERING SOCIETIES LIBRARY

(From March 1st to 31st, 1919)

DONATIONS*

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

THE SHIPBUILDING INDUSTRY.

By Roy Willmarth Kelly and Frederick J. Allen; With an Introduction by Charles M. Schwab. Bost. and N. Y., Houghton, Mifflin Company, 1918. 303 pp., 64 pl., 8 x 6 in., cloth. $3.00.

The primary purpose of this volume, as stated by the authors, is to describe and interpret for the general public, as well as for those employed in the shipyards, our war emergency shipping programme and the task of the shipbuilders. It is also hoped that the book will help those who wish to prepare themselves for executive positions and those considering shipbuilding or naval architecture as a possible life calling.

STEAM ENGINE TROUBLES:

A Practical Treatise for the Engineer, Telling How to Locate and Remedy Troubles with a Steam Engine; Cylinders, Valves, Pistons, Frames, Pillow Blocks and Other Bearings, Connecting Rods, Wristplates, Dashpots, Reachrods, Valve Gears, Governors, Piping, Throttle and Emergency Valves, Safety Stops, Flywheels, Oilers, etc., are All Treated. By H. Hamkens. N. Y., The Norman W. Henley Publishing Co., 1919. 284 pp., 276 illus., 8 x 5 in., cloth. $2.50.

A simple account of the troubles which may arise in steam engine operation, the causes, and the proper remedies, intended for the power plant engineer. Based on a series of articles published in *Power*.

AERONAUTICAL ENGINES:

A Critical Survey of Current Practice with Special Reference to the Balancing of Inertia Forces. By Francis John Kean. 2d ed. New York, Spon & Chamberlain; Lond., E. & F. N. Spon, Ltd., 1918. 101 pp., 49 illus., 31 pl., 8 x 5 in., cloth. $2.50.

This book consists of a course of ten lectures given during 1915 to men of the Royal Naval Air Service and the Royal Flying Corps, designers, and engineering students. Contents: The Nature of the Problems; Classifications of Aeroplane Engines; Relative Advantages of Different Types of Aeroplane Engines; Choosing the Number of Cylinders; Balancing the Sliding Parts of the Engine; Carburetion; Ignition; Typical Aeroplane Engines; Appendix.

GASOLINE AND KEROSENE CARBURETORS:

Construction—Installation—Adjustment; A Simple, Comprehensive Treatise for Practical Men, Explaining all Principles Pertaining to Carburetors for all Types of Internal Combustion Engines Intended to Operate on Liquid Fuels, Such as Gasoline, Kerosene, Benzol, and Alcohol. By Victor W. Pagé. New York, The Norman W. Henley Publishing Co., 1919. 219 pp., 89 illus., 8 x 5 in., cloth. $1.50.

This book is a handbook for operators of internal combustion engines, in which are explained, in non-technical language, the principles of carburetors, the usual modern types, and the method of adjusting and repairing them.

*Unless otherwise specified, books in this list have been donated by the publishers.

COMPRESSED AIR PLANT.

By Robert Peele. 3d ed. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1919. 485 pp., 246 illus., 54 tab., 9 x 6 in., cloth. $4.25.

This edition has undergone a thorough revision. A number of chapters have been rewritten and several have been expanded, while old material has been condensed or omitted. The volume describes current practice in the construction and operation of compressors and discusses the applications of compressed air drilling, pumping, and hauling, with special reference to mine service.

MODEL MAKING:

Including Workshop Practice, Design and Construction of Models; A Practical Treatise for the Amateur and Professional Mechanic, Giving Instructions on the Various Processes and Operations Involved in Model Making and the Actual Construction of Numerous Models, Including Steam Engines, Speed Boats, Guns, Locomotives, Cranes, etc.; Lathe Work, Pattern Work, Electroplating, Soft and Hard Soldering, Grinding, Drilling, etc., are also Included. Edited by Raymond Francis Yates. N. Y., The Norman W. Henley Publishing Co., 1919. 390 pp., 303 illus., 1 pl., 9 x 6 in., cloth. $3.00.

The author hopes that his book will promote interest in model engineering in this country and will also give a correct impression of its value as a recreation.

PUBLIC UTILITY RATE FIXING:

Comments on Current Problems Pertaining to Public Utilities and to Rate Fixing. By C. E. Grunsky. San Fran., Technical Publishing Company, 1918. 169 pp., 5 charts, 2 pl., 9 x 6 in., cloth. $2.50.

A reprint of a number of articles originally contributed to the *Journal of Electricity*, written in the hope that they may prove helpful in determining fair rates for the output of public utilities and in prescribing methods of procedure when rates are to be fixed; and that they may assist in the solution of some of the economic problems which arise in the readjustment to peace conditions.

RADIATION, LIGHT AND ILLUMINATION.

By Charles Proteus Steinmetz. Compiled and Edited by Joseph LeRoy Hayden. 3d ed. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1918. 305 pp., 127 illus., 1 pl., 14 tab., 9 x 6 in., cloth. $3.00.

A series of twelve experimental lectures, most of which were delivered in 1908–09, with the exception of two lectures on "Light Flux and Distribution," and "Light Intensity and Illumination." The treatment is non-mathematical and discusses the subjects in plain language. This edition is apparently a reprint of the preceding ones.

NOMON: A CALCULATING CHART. A MANUAL OF CHEMICAL NOMOGRAPHY.

By Horace G. Deming. Champaign, Ill., The University Press, 1918. In Two Parts, Text and Tables. $1.25. (Gift of Miles & Parris.)

The Nomon is a nomographic reckoner, devised by the author, for the graphic solution of various arithmetical problems. Multiplication, division, powers, roots, and logarithms can be treated by the eighteen charts, with an average error of one part in four thousand or five thousand. The Manual describes the method of using the Nomon, gives specific examples of its application to the solution of chemical problems, and indicates the kinds of calculations in which it is most useful.

HANDBOOK OF CHEMISTRY AND PHYSICS.

Compiled by Charles D. Hodgman, Assisted by Melville F. Coolbaugh and Cornelius E. Senseman. Cleveland, Ohio, The Chemical Rubber Co., 1918. 557 pp., 7 x 4 in., flexible cloth. $2.50.

This compilation is intended to present in one volume of convenient size a comparatively comprehensive reference book for the use of chemists and physicists. The seventh edition has been enlarged by 100 pages, which contain a revision of a table of the physical constants of organic compounds. This table now includes about two thousand substances. Various minor additions and corrections have been made throughout the work.

COTTON FACTS:

Compilation from Official and Reliable Sources of the Crops, Receipts, Exports, Stocks, Home and Foreign Consumption, Visible Supply, Prices, and Acreage of Cotton in the United States and Other Countries for a Series of Years, also Cotton Mill Statistics of the United States, Europe, India, etc., the Reports of Condition of Growing Cotton Crops, Issued by the U. S. Department of Agriculture, and the Cotton Acreage and Yield of Each State and County in the South According to the U. S. Census. Edited by Carl Geller. October, 1918, Edition. N. Y., Shepperson Publishing Co., 1918. 240 pp., 1 pl., 7 x 4 in., cloth. $1.00.

This volume is the forty-third annual issue. In a book of pocket size, it presents the statistics needed by cotton merchants, manufacturers, and growers, as indicated in the title.

NINETEENTH YEAR BOOK

Of The Rubber Association of America, Inc. N. Y., 1918. 119 pp., 9 x 6 in., paper.

The Year Book contains a list of the members, the constitution, and the annual report of the Association for 1918.

HEATON'S ANNUAL, 1919.

Published by Heaton's Agency. Toronto, Canada, 512 pp. (including advertisements), 7 x 5 in., cloth. $1.50.

A handbook of condensed commercial and industrial information on Canada. Describes the natural and commercial resources of the provinces, and industrial opportunities in the towns and cities. Much general information of use to visitors and business men is included.

STRUCTURAL ENGINEERS' HANDBOOK:

Data for the Design and Construction of Steel Bridges and Buildings. By Milo S. Ketchum. 2d ed. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1918. 896 pp., 165 tab., 9 x 6 in., flexible cloth. $5.00.

In preparing the new edition of this working manual for engineers, draftsmen, and students, the author has added details of steel windows and doors, data on cement and gypsum tile roofs, solutions for bending moments in mill building columns and stresses in stiff frames, has rewritten and enlarged the chapter on steel highway bridges, and has corrected all known errors.

THE DESIGN AND CONSTRUCTION OF DAMS:

Including Masonry, Earth, Rock-fill, Timber, and Steel Structures, Also the Principal Types of Movable Dams. By Edward Wegmann. 6th ed., rev. and enl.; 1918 reprint rev. N. Y., John Wiley & Sons, Inc., 1918. 529 pp., 198 illus., 157 pl., 24 tab., 12 x 9 in., cloth. $6.00.

The present volume is a reprint, with revisions, of the sixth (1911) edition of this well-known and popular treatise. A special feature of the book is the detailed information given concerning important dams in all parts of the world.

MEMBERSHIP

(From March 7th to April 3d, 1919)

ADDITIONS

MEMBERS		Date of Membership
ALBERT, FREDERICK WILHELM. Lt.-Col., U. S. A., 33d Engrs., Am. Exp. Forces, France; Address, 23 Isham St., Burlington, Vt.	Assoc. M.	Mar. 4, 1914
	M.	Jan. 14, 1919
BABBITT, HENRY KEEPERS. Supt., E. I. du Pont de Nemours & Co., Inc., Pompton Lakes, N. J.		Mar. 11, 1919
BIXBY, FREDERICK LOUIS. Senior Irrig. Engr., Bureau of Public Roads, U. S. Dept. of Agriculture, Univ. of Nevada, Reno, Nev.	Assoc. M.	June 6, 1911
	M.	Mar. 11, 1919
BOWMAN, BION ANGELO. Div. Engr., Fay, Spofford & Thorndike, 308 Boylston St., Boston, Mass.		Mar. 11, 1919
BOYAJOHN, HAIG MILTON. Superv. of Sub-Contracts, Am. International Shipbuilding Corporation, Hog Island, Pa.	Assoc. M.	June 4, 1913
	M.	Mar. 11, 1919
COMSTOCK, HAROLD DEARBORN. Project Mgr., Riverton Project, U. S. Reclamation Service, Riverton, Wyo.	Assoc. M.	April 5, 1910
	M.	Mar. 11, 1919
CONE, WILLIAM SMITH. Cons. Engr. (Cone & Harris), 1216 Hollingsworth Bldg., Los Angeles, Cal.		Nov. 26, 1918
DOBSON, GILBERT COLFAX. Maj., Engrs., U. S. A.; Prof. of Military Science and Tactics, Colorado School of Mines, Golden, Colo.	Assoc. M.	May 2, 1911
	M.	Mar. 11, 1919
EPPLE, EDWARD CHARLES. Chf. Engr., Am. Concrete Steel Co., Newark (Res., 36 Cleveland Terrace, Bloomfield), N. J.		Mar. 11, 1919
ERICSON, FREDERICK ANSON. Structural Engr., Thomas E. Murray, 64 Daily St., Nutley, N. J.		Mar. 11, 1919
FARRIN, JAMES MOORE. Capt., Engrs., U. S. A., 2d Engrs., Am. Exp. Forces, France.	Assoc. M.	Nov. 30, 1909
	M.	Sept. 10, 1918
FAWLEY, JAMES LINWOOD. Vice-Pres. and Chf. Engr., Geo. F. Pawling & Co., 1432 South Penn Sq., Philadelphia, Pa.		Mar. 11, 1919
FOUGNER, NICOLAY KNUDTZON. Pres., Fougner Staal-Beton Skibsbygn. Co., A/S (Fougner Concrete Shipbuilding Co.), Sjofartsbygningen, Christiania, Norway.	Assoc. M.	Feb. 4, 1913
	M.	Nov. 26, 1918
GREENE, RUSSELL DE COSTA. Asst. Chf. Engr., Am. Cyanamid Co., 511 Fifth Ave., New York City.	Assoc. M.	June 4, 1913
	M.	Mar. 11, 1919
HANSEN, HANS JORGEN. Office Engr., C., M. & St. P. Ry., 1055 North Francisco Ave., Chicago, Ill.		Mar. 11, 1919

MEMBERS (*Continued*)

		Date of Membership
JOHNSON, ARTHUR ALBERT. 1st Lieut., Engrs., U. S. A., 22d Engrs., Am. Exp. Forces, France; Address, 901 M St., N. W., Washington, D. C.		Jan. 13, 1919
PRICE, WILLIAM EDMUND. Contr. (Campbell & Price), 611 Majestic Bldg., Oklahoma, Okla.	Jun.	April 5, 1910
	Assoc. M.	Jan. 2, 1912
	M.	Mar. 11, 1919
RYAN, WALTER JACKMAN. Snoqualmie Falls, Wash.	Jun.	May 5, 1908
	Assoc. M.	Mar. 1, 1910
	M.	Mar. 11, 1919
SEARS, WILLIAM HATFIELD. Archt. and Heating Engr., James Bldg., Chattanooga, Tenn.	Assoc. M.	April 18, 1916
	M.	Mar. 11, 1919
SHANKLAND, RALPH GRAHAM. 1st Lieut., Engrs., U. S. A., U. S. General Hospital No. 16, New Haven, Conn.; With E. C. & R. M. Shankland, 1106 The Rookery, Chicago, Ill.	Jun.	Nov. 8, 1909
	Assoc. M.	Sept. 3, 1913
	M.	Mar. 11, 1919
STODDARD, LEWIS MALCOLM. Seattle, Wash.		Mar. 11, 1919
SULLIVAN, MAURICE JOSEPH. City Archt., 207 City Hall, Houston, Tex.	Assoc. M.	Mar. 4, 1914
	M.	Mar. 11, 1919
TARR, CHARLES WINTHROP. Vice-Pres. and Gen. Mgr., Morris Knowles, Ltd., Windsor, Ont., Canada (Res., The Elms, 110 Henry St., Detroit, Mich.)	Assoc. M.	June 6, 1906
	M.	Mar. 11, 1919
WEST, ROBERT KIRBY. Capt., Engrs., U. S. A., 3d Aviation Instruction Center, A. P. O. 724, Am. Exp. Forces, France.		Oct. 8, 1918
WHITTIER, WILMOT EDGAR. Care, U. S. Reclamation Service, Clint, Tex.		Mar. 11, 1919

ASSOCIATE MEMBERS

ANDERSON, ROBERT SUMTER. 201 Fontenelle Apartments, 5th and Denver Sts., Tulsa, Okla.	Jun.	Mar. 14, 1916
	Assoc. M.	Mar. 11, 1919
AUSTIN, HERBERT SIDNEY. Chf. Engr., Oklahoma Pipe Line Co., P. O. Drawer 1458, Muskogee, Okla.		Mar. 11, 1919
BABB, CHARLES STEWART. With Barber Asphalt Paving Co., 1328 Tribune Bldg., Chicago, Ill.		Mar. 11, 1919
BEANFIELD, RUFUS MCCLELLAN. Engr., Div. of Shipyard Plants, Emergency Fleet Corporation, 140 North Broad St., Philadelphia, Pa.		Mar. 11, 1919
BORDEN, GEORGE WILLIAM. Goldendale, Wash.		Nov. 26, 1918
BURKE, EDMUND POTTS. 706 Kresge Bldg., Detroit, Mich.		Mar. 11, 1919
BUTTERFIELD, DYER. With Price-Evans Foundry Co., Chattanooga, Tenn.		Mar. 11, 1919

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership
BYARS, GEORGE EMMETT. City Engr., City Hall, Waco, Tex	Oct. 8, 1918
CARMAN, CHARLES BLOOMFIELD. Capt., Engrs., U. S. A., Raritan Arsenal, Metuchen, N. J	Mar. 11, 1919
CHANDLER, JERMAIN. Designing and Cons. Engr., 561 Spitzer Bldg., Toledo, Ohio	Mar. 11, 1919
CHAPIN, FRANKLIN HENRY. Asst. Bridge Engr., Alaskan Eng. Comm., Anchorage, Alaska	Jan. 13, 1919
COLHOUN, DANIEL WARWICK. Maj., Tank Corps, U. S. A., Camp Meade, Md	Sept. 10, 1918
CORBIN, HORACE KELLOGG. 1st Lieut., Q. M. C., U. S. A., Constr. Div., 30 Church St., New York City	Jun. June 24, 1914 Assoc. M. Mar. 11, 1919
CORWIN, DANIEL CHAUNCEY. Asst. Supt., Raymond Concrete Pile Co., 113 Thirty-fourth St., Norfolk, Va	Mar. 11, 1919
CRAMER, WILLIAM NATHANIEL. Asst. Engr., Valuation Dept., Ill. Cent. R. R., Room 706, Central Station, Ill. Cent. R. R., Chicago, Ill	Mar. 11, 1919
DRAKE, RALPH EDMUND. 254 South 4th St., Fulton, N. Y	Jun. Jan. 31, 1911 Assoc. M. Mar. 11, 1919
DUCKWALL, ANDERSON EDWARD. Designer, H. C. Frick Coke Co., 500 George St., Scottdale, Pa	Mar. 11, 1919
DUGAN, FRANK CLARKE. Capt., Engrs., U. S. A., Office, Chf. of Engrs., 6th and B Sts., Room 5-303, Bldg. C, Washington, D. C	Mar. 11, 1919
FISHACH, LEYBORN GRIER. Care, Emergency Fleet Corporation, 136 South 16th St., Philadelphia, Pa	Mar. 11, 1919
HAASIS, CUTHBERT WEAD. 5713 Euclid Ave., Cleveland, Ohio	Mar. 11, 1919
HASWELL, JOHN ROBERT. Senior Drainage Engr., Bureau of Public Roads, 1350 Irving St., N. W., Washington, D. C. (Res., 402 Delaware Ave., Wilmington, Del.)	Jun. June 4, 1913 Assoc. M. Jan. 14, 1918
HENDERSON, JOSEPH NEWCOM. Civ. and Min. Engr. (Herbert & Henderson), Box 131, Kittanning, Pa	Mar. 11, 1919
HENDERSON, VOLNEY HOWARD. McAllen, Tex	Nov. 26, 1918
HESSELBERGER, MILTON. Municipal Engr. and Licensed Surv., 307 Tajo Bldg., Los Angeles, Cal	Mar. 11, 1919
HIGHT, WILLIAM CLARENCE. (Pritchett & Hight), Walnut Ridge, Ark	Mar. 11, 1919
HOYT, SIDNEY MERRILL. Capt., Q. M. C., U. S. A., Constr. Div., Bldg. C, Room 3-331, 7th and B Sts., Washington, D. C	Sept. 10, 1918

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership
JAMESON, ROBERT OLEN. Chf. Engr., W. C. Hedrick Const. Co., 342 South Rosemont Ave., Dallas, Tex		Mar. 11, 1919
MANHEIMER, LOUIS B. Capt., Engrs., U. S. A.; Asst. Dept. Engr., Southeastern Dept., U. S. War Dept., Charleston, S. C		Nov. 26, 1918
MILLER, KARL ANDREW. Sergeant, Care, G-2-C, Headquarters, 3d Army, Am. Exp. Forces, Coblenz, Germany	Jun.	Dec. 2, 1914
	Assoc. M.	Jan. 13, 1919
MURPHY, KENDALL TUTTLE. Box 237, Penniman, Va		Oct. 9, 1917
OTIS, WILBUR CORTHELL. Outside Supt., Public Works Dept., Navy Yard, Boston, Mass		Mar. 11, 1919
RICHARDSON, FRANK EDISON. Mgr., Gasoline Dept., Okmulgee Producing & Refining Co., Inc., Box 806, Henryetta, Okla		Mar. 11, 1919
SCHNEPFE, FREDERICK ERNEST. 3141 Frederick Ave., Baltimore, Md		Nov. 26, 1918
SMITH, ROSCOE LEE. 122 East Front St., Berwick, Pa		Mar. 11, 1919
STANLEY, LLOYD LAWRENCE. 1st Lieut., Engrs., U. S. A., 3325 Eighteenth St., N. W., Washington, D. C. (Res., 526 West 10th St., Sioux Falls, S. Dak.)		Mar. 11, 1919
VAN SISE, ANDREW JACKSON. County Engr., Audubon County, Audubon, Iowa	Jun.	Jan. 15, 1917
	Assoc. M.	Jan. 13, 1919
WARMAN, WILLIAM RYMOND. Broadway, N. J		Oct. 8, 1918
WELLS, WALTER MELVIN. 416 Insurance Exchange, San Francisco, Cal		Sept. 10, 1918
WHITMORE, HAROLD CUSHING. Constr. Engr., Stone & Webster, 145 Broadway, Pawtucket, R. I	Jun.	April 30, 1912
	Assoc. M.	Mar. 11, 1919
WILLCOMB, ROLAND HOWARD. Engr., City of San Diego; Res. Engr., Lower Otay Dam, Lowerotay, Cal		Jan. 13, 1919
WILMOT, SYDNEY. Asst. Prof. of Eng., Brown Univ. (Res., 63 Elmgrove Ave.), Providence, R. I	Jun.	Nov. 8, 1909
	Assoc. M.	Jan. 13, 1919
WRIGHT, THOMAS PARKS. Cons. Engr. (Geo. N. Mitcham & Thos. P. Wright), 712 Flatiron Bldg., Atlanta, Ga.		Mar. 11, 1919

ASSOCIATES

SCHMIDT, FRED RUDOLPH. Sales Mgr., The United States Portland Cement Co., 305 Ideal Bldg., Denver, Colo.	Mar. 11, 1919

JUNIORS

HANSELMAN, WILLIAM LOUIS. 152 Midland Ave., Montclair, N. J	Mar. 11, 1919
RICHARDSON, THOMAS COLYER. P. O. Box 559, Vicksburg, Miss.	Sept. 10, 1918
VAN EENENAAM, CORNELIUS. Care, County Highway Dept., St. Clair County, Belleville, Ill	Mar. 11, 1919

DEATHS

BROWN, RALPH HENRY. Elected Member, June 7th, 1899; died February 22d, 1919.

GEER, HARVEY MOSHER. Elected Member, June 6th, 1894; died March 18th, 1919.

HALCOMBE, NORMAN MARSHALL. Elected Junior, September 3d, 1907; Associate Member, May 2d, 1911; died February 15th, 1919.

HAZLEHURST, JAMES NISBET. Elected Member, October 4th, 1899; died February 9th, 1919.

STEVENS, GEORGE M. Elected Associate Member, November 6th, 1907; died September, 1918.

Total Membership of the Society, April 3d, 1919, 9 011.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(March 1st, to March 22d, 1919)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

(2) *Journal,* Engrs. Club of Phila., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Chicago, Ill., 50c.
(5) *Journal,* Eng. Inst. of Canada, Montreal, Que., Canada.
(6) *Journal,* Am. Inst. of Archts., Washington, D. C., 50c.
(8) *Stevens Indicator,* Hoboken, N. J., 50c.
(9) *Industrial Management,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News-Record,* New York City, 15c.
(15) *Railway Age,* New York City, 15c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Electric Railway Journal,* New York City, 10c.
(18) *Railway Review,* Chicago, Ill., 15c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 20c.
(21) *Railway Engineer,* London, England, 1s. 2d.
(22) *Iron and Coal Trades Review,* London, England, 6d.
(24) *American Gas Engineering Journal,* New York City, 10c.
(25) *Railway Mechanical Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England, 4d.
(27) *Electrical World,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, Mass., $1.
(29) *Journal,* Royal Society of Arts, London, England, 6d.
(32) *Mémoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil,* Paris, France, 1 fr.
(36) *Cornell Civil Engineer,* Ithaca, N. Y.
(42) *Proceedings,* Am. Inst. Elec. Engrs., New York City, $1.
(43) *Annales des Ponts et Chaussées,* Paris, France.
(45) *Coal Age,* New York City, 10c.
(46) *Scientific American,* New York City, 15c.
(47) *Mechanical Engineer,* Manchester, England, 3d.
(54) *Transactions,* Am. Soc. C. E., New York City, $12.
(55) *Mechanical Engineering:* Journal, Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. and Metallurgical Engrs., New York City, $6.
(57) *Colliery Guardian,* London, England, 5d.
(58) *Proceedings,* Engrs.' Soc., W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
(59) *Proceedings,* American Water-Works Assoc., Troy, N. Y.
(60) *Municipal and County Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Drop Forger,* Thaw Bldg., Pittsburgh, Pa., 10c.
(63) *Minutes of Proceedings,* Inst. C. E., London, England.
(64) *Power,* New York City, 5c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Gas Journal,* London, England, 6d.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(71) *Journal,* Iron and Steel Inst., London, England.
(71a) *Carnegie Scholarship Memoirs,* Iron and Steel Inst., London, England.
(72) *American Machinist,* New York City, 15c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(77) *Journal,* Inst. Elec. Engrs., London, England, 5s.
(83) *Gas Age,* New York City, 15c.
(85) *Proceedings,* Am. Ry. Eng. Assoc., Chicago, Ill.
(86) *Engineering and Contracting,* Chicago, Ill., 10c.
(87) *Railway Maintenance Engineer,* Chicago, Ill., 10c.

(89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., $5.
(90) *Transactions*, Inst. of Naval Archts., London, England.
(91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
(92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
(93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
(96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
(98) *Journal*, Engrs. Soc., Pa., Harrisburg, Pa., 30c.
(99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, $2.
(100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
(101) *Metal Worker*, New York City, 10c.
(103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
(104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
(105) *Chemical and Metallurgical Engineering*, New York City, 25c.
(106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
(107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
(109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
(110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
(111) *Journal of Electricity*, San Francisco, Cal., 25c.
(113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.
(114) *Journal*, Institution of Municipal and County Engineers, London, England, 1s. 6d.
(115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.
(116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.
(117) *Engineering World*, Chicago, Ill.
(118) *Times Engineering Supplement*, London, England, 2d.
(119) *Landscape Architecture*, Harrisburg, Pa., 50c.
(120) *Automotive Industries*, New York City, 15c.

LIST OF ARTICLES

Bridges.

Concrete Caissons Sunk by the Open Dredging Method.* L. W. Skov. (4) June, 1918.
New and Little-Known Methods of Calculation of Girders, Beams and Arches.* James S. Martin. (58) Dec., 1918.
Arch Analysis by a Method Using Variable Elastic Weights.* F. J. Dulude. (13) Mar. 6.
Reinforced Concrete Slab Bridge Design Based on Tests of Full-Size Slabs.* A. T. Goldbeck. (From *Public Roads.*) (96) Mar. 6.
Canadian Reinforced Concrete Arch Bridges.* Frank Barber. (96) Mar. 13.
Move Bridge Spans 136 Ft. Endwise on Car Trucks.* (13) Mar. 13.
Cantilever Erection of Draw in Open Position While Old Draw Serves as Fixed Span.* (13) Mar. 20.
Keep Accurate Costs on War-Time Fee Contract.* Farley Gannett and J. D. Carpenter. (13) Mar. 20.

Electrical.

The Supply of Single-Phase Power from Three-Phase Systems.* Miles Walker. (77) Jan.
The Conversion of Complex Quantities.* W. H. Grinsted. (73) Feb. 14.
An Electrolytic Method of Determining the Electric Field Round an Insulator. W. Estorff. (Abstract of article in *Electrotechnische Zeitschrift.*) (73) Feb. 14.
The Resistance of an Electrolytic Cell.* Edgar Newbery. (Abstract of paper read before Faraday Soc.) (73) Feb. 14.
Electric Generation by Diesel Engine.* E. J. Richards. (111) Feb. 15.
Electric Cables at Mines.* W. T. Anderson. (Abstract of paper read before Assoc. of Min. Elec. Engrs.) (22) Feb. 21.
Notes on Losses in Sheet Iron at High Frequencies.* Marius Latour. (Paper read before Société Internationale des Electriciens.) (73) Feb. 21.
The Influence of the Distribution of Losses on the Efficiency Curves of a Continuous Current Motor.* Thomas Carter. (73) Serial beginning Feb. 21.
Starting Synchronous Motors. E. E. George. (27) Mar. 1.
Radio Apparatus for Artillery Fire Control.* G. Francis Gray and John W. Reed. (27) Mar. 1.
Filing System for Central Station Use.* C. C. Hogan. (111) Mar. 1.
Modern Welding by Electricity. (From *Electrical Review.*) (19) Mar. 1.
Effect of Interpoles on Commutation of Direct-Current Machines.* R. L. Witham. (64) Mar. 4.
The Standardization of Polyphase Voltages. R. Rüdenberg. (Abstract of article in *Elektrotechnische Zeitschrift.*) (73) Mar. 7.
Live Roller Motors in Steel Works.* W. W. Wood. (Abstract of article in *Magnet Magazine.*) (73) Mar. 7.
Radio Direction-Finding Apparatus.* A. S. Blatterman. (27) Mar. 8.

* Illustrated.

Electrical—(Continued).

Tests of Ignition Apparatus.* P. M. Heldt. (120) Mar. 13.
Extending the Life of Wood Poles.* Charles R. Harte. (17) Mar. 22.
Design of Small Direct-Current Armatures.* C. R. Wylie. (27) Mar. 29.
Recherches sur le Fonctionnement Chimique de l'Accumulateur au Plomb. Ch. Fery. (92) Jan.
La Mécanisme de la Rupture des Isolants Electriques.* (33) Feb. 1.

Marine.

The Application of Electric Welding to Steel Shipbuilding.* H. A. Horner. (58) Jan.
La Marche des Mines Flottantes dans l'Atlantique Nord et l'Ocean Glacial pendant et après la Guerre.* Albert de Monaco. (33) Jan. 18.
Double-Reduction Geared Turbines for *S. S. Mereda.** (11) Feb. 14.
Economic Size of Concrete Ships.* E. O. Williams. (11) Feb. 14.
The British Two-Stroke Motor.* (For Ships.) (12) Feb. 21.
The Shipping Situation and the Construction of the Squantum Destroyer Plant.* Thomas C. Atwood. (28) Mar.
Speed Dimensions and Form of Cargo Vessels.* G. S. Baker and J. L. Kent. (Paper read before Inst. of Engrs. and Shipbuilders in Scotland.) (11) Mar. 7.
British Concrete Shipyards.* W. Noble Twelvetrees. (11) Mar. 14.
F-5-L Navy Flying Boat.* S. T. Williams. (120) Serial beginning Mar. 20.
Side Launching a Concrete Lighter.* (13) Mar. 20.
Fabricated Ship Construction at Bristol Yard.* (13) Mar. 20.
Le Problème de la Marine Marchande, son Importance pour la France Pendant et Après la Guerre. Emile Gouault. (33) Jan. 11.
Kuhlschiffe für Lebensmitteltransport.* H. Guyer. (107) Feb. 8.
Turbo-elektrischer Schiffschrauben-Antrieb von Ljungström. (107) Feb. 15.

Mechanical.

Advantages of High Pressure and Super-Heat as Affecting Steam Plant Efficiency.* Eskil Berg. (4) June, 1918.
The Use of High-Pressure and High-Temperature Steam in Large Power Stations.* J. H. Shaw. (77) Jan.
Torsional Loads in the Fuselage of an Aeroplane.* A. J. Sutton Pippard. (11) Feb. 14.
The Manufacture and Design of Toothed Gearing.* Joseph Chilton. (Paper read before the North-East Coast Inst. of Engrs. and Shipbuilders.) (11) Serial beginning Feb. 14.
Fusing Temperature of Ash. Arno C. Fieldner and Others. Abstract of Report issued by U. S. Bureau of Mines.) (22) Feb. 14.
Conveyors in Relation to Engineering Works.* W. W. Atherton. (117) Feb. 15.
Secondary Reactions of Oxide of Iron Purification. G. Weyman. (66) Feb. 18.
The Draper Coal Washing Machine.* G. Knox. (Abstract of paper read before South Wales Inst. of Engrs.) (12) Feb. 21.
The Optical Determination of Stresses in Aeroplane Spars.* A. R. Low. (Paper read before Royal Aeronautical Soc.) (11) Feb. 21.
Handling of Coke.* C. J. Woodhead. (Paper read before Manchester and Junior Gas Assoc.) (66) Feb. 25.
Low-Temperature Carbonization in Relation to the Production of Motor Spirit, Fuel Oils, Smokeless Fuel, and Power Gas: Its Aims and Objectives.* F. B. Marshall. (66) Serial beginning Feb. 25; (22) Feb. 28.
Sliding Friction in Ball-Bearings.* Arvid Palmgren. (11) Feb. 28.
The Measurement of Fluid Velocity and Pressure.* J. R. Pannell. (11) Serial beginning Feb. 28.
The Visibility of Airplanes.* M. Luckiesh. (3) Mar.
Stresses in Wire Rope.* Shortridge Hardesty. (55) Mar.
Liberty Engine Tests.* (55) Mar.
The Loomis Cooling System for Aircraft.* (From *Bulletin* of the Experimental Dept., Bureau of Aircraft Production.) (55) Mar.
The Value of Insulation and Losses in B. T. U.'s.* William N. Allman. (25) Mar.
Lubrication of Air Compressors.* H. U. Conrad. (Extract from Report issued by Compressed Air Soc.) (16) Mar. 1; (86) Mar. 19; (20) Mar. 20.
Operating a Water Gas Set without a Relief Holder in Parallel with By-Product Coke Ovens.* A. H. Harris, Jr. (24) Mar. 1.
Calculation of Plant Efficiencies and Fuel Costs.* J. T. Foster. (64) Mar. 4.
Water-Tube Boiler Tube Ruptures.* Weldon Melroy. (64) Mar. 4.
Use of Lignite, Bagasse and Wood Waste for Power Generation and Heating.* John B. C. Kershaw. (45) Mar. 6.
The Altitude Engine Test Laboratory.* P. M. Heldt. (For Aeroplanes.) (120) Mar. 6.
Pulverized Coal Burners *versus* Stokers.* Joseph T. Foster. (27) Mar. 8.
The Utilization of Peat for Power Generation.* John B. C. Kershaw. (12) Serial beginning Mar. 14.

* Illustrated.

Mechanical—(Continued).

The 270-H. P. Basse-Selve Aero Engine.* (12) Mar. 14.
All-New Water Gas Plant Results at Providence.* Wm. Russell. (Abstract of paper read before New England Gas Men.) (83) Serial beginning Mar. 15.
Deoxidizing Water to Prevent Pipe Corrosion. F. N. Speller. (Abstract of paper read before Am. Soc. of Heating and Ventilating Engrs.) (16) Mar. 15.
Areas of Segments of Boiler Heads.* (64) Mar. 18.
Chart for Finding the Factor of Evaporation.* G. H. Sheasley. (64) Mar. 18.
Factors in High-Speed Engine Development.* D. McCall White. (Paper read before Soc. of Automotive Engrs.) (120) Serial beginning Mar. 20.
Radiator Cooling Fans.* George W. Hoyt. (From a paper read before Soc. of Automotive Engrs.) (120) Mar. 20.
F-5-L Navy Flying Boat.* S. T. Williams. (120) Serial beginning Mar. 20.
Bureau of Standards Carbureter Test Plant.* P. M. Heldt. (120) Mar. 20.
On Proportioning Engine Bearings.* Otto M. Burkhardt. (From a paper read before Soc. of Automotive Engrs.) (120) Mar. 20.
Treatment of Acidulous Water for Steam Purposes. E. A. Reilly. (45) Mar. 20.
La Fabrication des Pierres à Briquets en Ferro-Cérium, Système Visseaux. A. Frillat. (92) Jan.
Notes sur le Soudage des Verres. Léon Appert. (92) Jan.
Appareil Indicateur-Totalisateur de la Consommation de Charbon, Système Lea.* P. Letheule. (33) Feb. 8.
La Fabrication de la Verrerie de Laboratoire en Angleterre. (33) Mar. 1.
L'Utilisation Commerciale des Aéronefs Rigides. A. Poidlouë. (33) Mar. 1.
Vom Quecksilberdampf-Gleichrichter.* (107) Sept. 28, 1918.
Entwicklungsformen des Dampf-Kälteprozesses.* P. Ostertag. (107) Jan. 25.
Ueber Toleranzen im Maschinenbau. Ad. Debrunner. (107) Feb. 8.

Metallurgical.

The Application of Electric Welding to Steel Shipbuilding.* H. A. Horner. (58) Jan.
The Evolution of the Puddling Process. Cecil H. Desch. (Abstract of paper read before Staffordshire Iron and Steel Inst.) (22) Serial beginning Feb. 14.
Experimenting with the Electric Furnace. Wirt S. Scott. (111) Feb. 15.
The Electron-Furnace Spectrum of Iron. G. A. Hemsalech. (11) Feb. 21.
Uses Electric Furnace in Malleable Foundry.* F. L. Prentiss. (20) Feb. 27.
Electric Welding.* J. H. Paterson. (Paper read before Assoc. of Eng. and Shipbuilding Draughtsmen.) (11) Feb. 28.
Electric Furnaces as Applied to Steel Making.* Henry Lawrence Hess. (55) Mar.
Heat Treatment of Low-Carbon Steel.* W. M. Wilkie. (55) Mar.
Checking Pyrometers to Get Results.* (62) Mar.
Milling Calculations.* Robert S. Lewis. (105) Mar. 1.
A New Lead-Zinc Mill in Colorado.* (16) Mar. 1.
Leaching of Lead from Carbonate Ores.* Dorsey A. Lyon and Oliver C. Ralston. (103) Mar. 1.
Concentration of Graphite Ores.* George D. Dub. (Abstract from War Minerals Investigation Series No. 3, U. S. Bureau of Mines.) (103) Mar. 1.
Modern Welding by Electricity. (From *Electrical Review.*) (19) Mar. 1.
Foundry Built Around a Shop Truck.* (20) Mar. 6.
Foundry Ventilation.* (From *Foundry World.*) (20) Mar. 6.
A Technical Study of Acid Bessemer Steel. Richard S. McCaffery. (Abstract of article from *Wisconsin Engineer.*) (20) Mar. 6.
Live Roller Motors in Steel Works.* W. W. Wood. (Abstract of article in *Magnet Magazine.*) (73) Mar. 7.
International Nickel Company's Refining Works at Port Colborne, Ontario.* W. L. Wotherspoon. (16) Mar. 8.
Calibration of Base-Metal Thermocouples.* C. S. Crouse. (16) Mar. 8.
Electric Heat Treatment of Gun Forgings.* C. E. Wright. (20) Mar. 13.
The Hardening of Steel.* H. C. H. Carpenter. (Paper read before Royal Inst.) (11) Mar. 14.
Melting Brass in a Rocking Electric Furnace.* H. W. Gillett and A. E. Rhoades. (From *Bulletin* issued by U. S. Bureau of Mine.) (11) Mar. 14.
Magnetic Concentration of Pyrrhotite Ores.* J. P. Bonardi. (U. S. Bureau of Mines.) (105) Mar. 15.
Observations on Flaky and Woody Steel.* Federico Giolitti. (105) Mar. 15.
Decomposition of Metals.* A. I. Krynitzky. (105) Mar. 15.
Temperature Uniformity in an Electric Furnace.* John B. Ferguson. (From *Physical Review.*) (105) Mar. 15.
The Practical Analysis of Molding Sand.* F. Albert Hayes. (For Foundry Work.) (20) Mar. 20.
Dry Gas Cleaner.* J. C. Barrett. (For Blast Furnace.) (20) Mar. 20.
Standards of Temperature and Means of Checking Pyrometers.* (72) Mar. 20.
Effect of Air in Cyanidation. N. S. Keith. (16) Mar. 22.
Re-treating Zinc Tailings in Wisconsin.* W. F. Boericke. (16) Mar. 22.

* Illustrated.

Military.

Notes on the Field Emplacement of a German Large Caliber Gun.* G. B. Pillsbury. (100) Nov., 1918.
Operation of the Utilities at Camp Devens, Mass.* Edward W. Briggs. (109) Feb.
Liberty Engine Tests.* (55) Mar.
The Boston Army Supply Base—Construction Features. Charles R. Gow. (109) Mar.
The Boston Army Supply Base—General Data. Charles M. Spofford. (109) Mar.
Radio Apparatus for Artillery Fire Control.* G. Francis Gray and John W. Reed. (27) Mar. 1.
Radio Direction-Finding Apparatus.* A. S. Blatterman. (27) Mar. 8.
Electric Heat Treatment of Gun Forgings.* C. E. Wright. (20) Mar. 13.
Standard Gauge Railway Work at the Front. (96) Mar. 20.
La Marche des Mines Flottantes dans l'Atlantique Nord et l'Ocean Glacial pendant et après la Guerre.* Albert de Monaco. (33) Jan. 18.

Mining.

High Temperatures in Deep Mines. William Garforth. (106) Jan.
Separation-Doors at the Bottom of the Upcast Pit, Worked Automatically by Tubs Attached to Endless-Rope (Undertub-Tub) Haulage.* Clement Fletcher. (106) Jan.
Electric Generation by Diesel Engine.* E. J. Richards. (Copper Mining.) (111) Feb. 15.
Removal of a Vertical Shaft Pillar.* (117) Feb. 15.
Use of the Cement Gun in a Bituminous Coal Mine.* M. S. Sloman. (117) Feb. 15.
Humidity of Deep Mines. Sydney F. Walker. (117) Feb. 15.
Electric Cables at Mines.* W. T. Anderson. (Abstract of paper read before Assoc. of Min. Elec. Engrs.) (22) Feb. 21.
Ferro-Concrete Coal Pit Props. (117) Mar. 1.
Sampling of Dust in Mine Air.* J. Boyd. (Abstract.) (16) Mar. 1.
Breaking of Cable in Protection Shaft.* Robert Dunn. (45) Mar. 13.
Modern Shaft Development of the Consolidation Coal Company.* George W. Harris. (45) Serial beginning Mar. 13.
Neutralizing Acid Mine Water. (Abstract from *South African Mining Journal and Engineering Record.*) (16) Mar. 15.
Rand Gold Mining.* "South African". (16) Mar. 15.
Methods and Cost of Driving a 10 x 12 Ft. Mining Tunnel at Copper Mountain, B. C. (86) Mar. 19.
The Mines of Bruay, France.* Gaston Libiez. (45) Mar. 20.
Ventilation Methods in Coeur d'Alene Mines. Robert N. Bell. (Abstract from Report of State Inspector of Mines of Idaho.) (103) Mar. 22.

Miscellaneous.

The Variation of Measuring Instruments.* Frederick J. Schlink. (Paper issued by U. S. Bureau of Standards.) (11) Feb. 14.
Uniform Filing System. C. C. Hogan. (111) Feb. 15.
Fundamentals of a Uniform Cost Accounting System. G. A. Schonlau. (117) Feb. 15.
The Composition of Petroleum and Coal. J. Marcusson. (From *Chemiker Zeitung.*) (57) Feb. 21.
Filing System for Central Station Use. C. C. Hogan. (111) Mar. 1.
The Altitude Engine Test Laboratory.* P. M. Heldt. (120) Mar. 6.
Melting Points and Other Temperatures.* (From *Circular* of the Bureau of Standards.) (16) Mar. 15.
Les Efforts de l'Industrie française pendant la Guerre: Dévelopment Actuel de l'Industrie de l'Acétate de Cellulose et de ses Applications. Clément et Rivière. (92) Sept., 1918.
Les Fabrications des Colorants Artificiels Employés en Histologie et en Bactériologie, Système Agulhon. Prud'Homme. (92) Jan.
Bras Artificiel à Poignet et Main Articulés, Système R. Böhler.* Léon Masson. (92) Jan.
Les Industries et le Commerce du Lait Pendant la Guerre; leur Avenir.* Paul Razous. (33) Serial beginning Feb. 8.
Teuerung und Teuerungszulagen.* R. Dubs and B. Grämiger. (107) Jan. 18.
Die Windgeschwindigkeit beim Föhnsturm vom 4./5. Januar 1919 in Zurich.* (107) Feb. 8.

Municipal.

The Development of a Street Plan.* Arthur A. Shurtleff. (119) Jan.
Suggestions to Town Planners. (Issued by Dept. of Labor, Bureau of Industrial Housing and Transportation.) (119) Jan.
Report of the Milwaukee Housing Commission. (6) Feb.
Wettbewerb für eine Wohnkolonie im Fuchsenreid in Bözingen bei Biel. (107) Feb. 15.

* Illustrated.

* Illustrated.

Railroads.

The Arithmetic of Railroading. W. J. Cunningham. **(65)** Feb.; **(18)** Serial beginning Mar. 1.
Coaling Station of the Philadelphia & Reading Railway.* **(117)** Feb. 15.
High Power Electric Locomotives for Narrow Gauge Goods Trains.* **(73)** Serial beginning Feb. 21.
Second Track Construction on the Hocking Valley.* **(15)** Feb. 28.
A New Station for the Santa Fe at San Bernardino.* **(15)** Feb. 28.
Standard Heavy 2-10-2 Locomotive.* **(25)** Mar.
Automobile Cars for the I. C.* **(25)** Mar.
Steam *vs.* Electric Locomotives.* **(25)** Mar.
The Railways of the Republic of Chile.* Clayton Sedgwick Cooper. **(18)** Mar. 1.
Santa Fe Locomotive, Pennsylvania Lines West.* **(18)** Mar. 1.
The Hetch Hetchy Railroad.* Rudolph W. Van Norden. **(111)** Mar. 1.
Philadelphia and Reading 2-8-0 Type Locomotive.* **(18)** Mar. 1; **(15)** Mar. 21.
Railway Right-of-Way Surveys and Descriptions.* Edward Thompson Wilkie. (Paper read before Ontario Land Surveyors.) **(96)** Mar. 6.
Standardized Wagon Designs. J. R. Bazin. (From a paper read before Inst. of Locomotive Engrs.) **(57)** Serial beginning Mar. 7.
An Analysis of the Locomotive Terminal Problem.* Gustave E. Lemmerich. **(15)** Serial beginning Mar. 7.
The Progress of the Alaskan Railroad.* Franklin K. Lane. (From *Congressional Record.*) **(15)** Mar. 7.
Toledo & Ohio Central Engine Terminal.* **(18)** Mar. 8.
Operation of New York Central's Cleveland Freight Terminal.* W. E. Phelps. **(13)** Mar. 13.
New Engine Terminal Outside City Avoids Congestion.* **(13)** Mar. 13.
Double Track Improvement on "Big Four" Railroad. **(13)** Mar. 13.
Chicago Union Station to Spend $5 300 000 in 1919.* **(13)** Mar. 13.
Heavy Standard Mallet Type Locomotive.* **(15)** Mar. 14.
Bolivia's Railways—Progress and Prospects.* William A. Reid. **(18)** Mar. 15.
Railway Terminal Problem at the Port of New York. **(46)** Mar. 15.
Powdered Fuel Burning Apparatus for an Australian Railway.* **(18)** Mar. 15.
Concreting 2 000-Ft. Single Track Railway Tunnel in Service.* **(86)** Mar. 19.
Standard Gauge Railway Work at the Front.* **(96)** Mar. 20.
New Plan for a Union Station at Cleveland, Ohio.* **(15)** Mar. 21.
Gondola Car of Reinforced Concrete Construction.* **(15)** Mar. 21.
New Terminal for the Michigan Central.* **(18)** Mar. 22.
Tunnel Lining on the Pittsburgh & Shawmut R. R. **(18)** Mar. 22.
L'Evolution de la Locomotive à Grande Vitesse de 1878 à 1914 et l'Influence de l'Ecole alsacienne sur cette Evolution.* **(33)** Feb. 8.
Zur Berechnung von Tragfedern für Eisenbahn-Fahrzeuge.* K. Witzig. **(107)** Dec. 28, 1918.
Die Schaltung der Maschinenfabrik Oerlikon zur Energierückgewinnung auf Einphasenbahnen.* W. Kummer. **(107)** Jan. 11.
Triebwerk-Anordnung und störende Nebenbewegungen elektrischer Lokomotiven. W. Kummer. **(107)** Feb. 8.

Railroads, Street.

Detroit Plans Comprehensive Scheme for Grade Crossing Removal.* **(13)** Mar. 13.
Some Results of Rail Conservation. W. R. Dunham, Jr. **(17)** Mar. 22.
Up-to-Date Practice in Compressor Maintenance.* **(17)** Mar. 22.
Les Installations Electriques de Tramways desservant les Chantiers Navals de Philadelphie.* **(33)** Feb. 8.

Roads and Pavements.

Engineers Must Study Road Foundations. **(117)** Feb. 1.
Highway Foundation Requirements. **(117)** Mar. 1.
Road Building with Industrial Railway. R. P. Mason. (From a paper read before Road School of the Univ. of Michigan.) **(86)** Mar. 5.
Conclusions of Wisconsin Highway Commission on Surface Treatment of Macadam. **(86)** Mar. 5.
Methods of Removing Snow from Highways. Raymond Beck and others. (From *Bulletin* issued by Highway Transport Committee of the Council of National Defense.) **(86)** Mar. 5.
Road Grading with Blade Grader-Tractor Outfit.* F. F. Mengel. (Paper read Road School of Wisconsin Highway Comm.) **(86)** Mar. 5.
Results of Wisconsin Experiment in Covering Sand Roads with Hay-Tar Mat. (From Report issued by Wisconsin Highway Comm.) **(86)** Mar. 5.
Efficiency of Bituminous Surfaces and Pavements Under Motor Truck Traffic. Prévost Hubbard. (Paper read before Am. Road Builders' Assoc.) **(96)** Mar. 6; **(13)** Mar. 6.
Wider Pavements Needed by Motor Vehicles at Curves.* G. S. Eaton. **(13)** Mar. 6.
Vitrified Brick Construction for Heavy Motor-Truck Traffic. W. M. Acheson. (Abstract of paper read before Am. Road Builders' Assoc.) **(13)** Mar. 6.

* Illustrated.

* Illustrated.

Roads and Pavements—(Continued).

Road Foundations, Drainage and Culverts.* George Hogarth. (96) Mar. 6.
Roads in Coleman Township.* H. T. Routly. (Paper read before Assoc. of Ontario Land Surveyors.) (96) Mar. 6.
Smooth Dustless Roads Maintained by Gang System.* (13) Mar. 13.
Salt-Marsh Sand Clay as a Road-Building Material.* R. H. Phillips. (From Report made to State Highway Dept. of Texas.) (13) Mar. 20.
Stone and Gravel Road Construction. J. G. Wilson. (96) Mar. 20.

Sanitation.

Aligning Drain Pipe.* Harry Gardner. (117) Feb. 15.
Sewage Disposal Works at London, Ontario.* Willis Chipman. (96) Mar. 6.
Concrete Sewer-Pipe Specifications Adopted by Los Angeles.* (13) Mar. 13.
Drainage Works on Railway Lands. G. A. McCubbin. (Paper read before Assoc. of Land Surveyors.) (96) Mar. 13.

Structural.

The Skyscraper and Building Heights in the United States.* R. F. Fleming. (4) June, 1918.
New and Little-Known Methods of Calculation of Girders, Beams and Arches.* James S. Martin. (58) Dec., 1918.
Building Houses Without Bricks. William Calway. (114) Feb.
Reinforced Concrete Roof for Craneways in Buildings.* Albert M. Wolf. (117) Feb. 15.
Floating Pneumatic Grain Elevators.* (12) Feb. 28.
Vehicular Tunnels Under the Hudson River.* Martin Schreiber. (3) Mar.
The Resistance of Materials.* G. S. Chiles and R. G. Kelley. (25) Serial beginning Mar.
Test of a Concrete Floor.* Arthur N. Talbot and Harrison F. Gownerman. (*Bulletin* of the University of Illinois.) (117) Mar. 1.
Measuring the Pressure of Wind in Chimneys.* Omori. (117) Mar. 1.
Concrete as a Chemical Engineering Material. Maximilian Toch. (Paper read before Am. Inst. of Chem. Engrs.) (105) Mar. 1.
Storage Tanks Made of Reinforced Concrete.* F. W. Frerichs. (Paper read before Am. Inst. of Chem. Engrs.) (105) Mar. 1.
The Proposed Vehicular Tunnel Under the Hudson River.* (46) Mar. 8.
Weights of Steel Roof Trusses by Empiric Formulas.* R. Fleming. (13) Mar. 20.
Concrete Moulding Plant, Pennsylvania R. R.* (18) Mar. 22.
Cause de la Rupture Prématurée des Pièces d'Acier Soumises à des Efforts Répétés Inexactitude des Lois de Wöhler.* Ch. Fremont. (33) Jan. 18.
Les Nouvelles Instructions Hollandaises Relatives aux Constructions en Béton Armé.* (33) Mar. 1.
Régles à Guerre pour l'Etablissement des Longs Tunnels sous Nappe d'Eau. (33) Feb. 8.

Topographical.

Mapping Niagara at the Brink.* L. R. Brown. (117) Feb. 15.
Railway Right-of-Way Surveys and Descriptions.* Edward Thompson Wilkie. (Paper read before Assoc. of Ontario Land Surveyors.) (96) Mar. 6.

Water Supply.

Expediency of Raising Water Rates to Offset Increased Costs. John F. Moore. (28) Sept., 1918.
Practical Methods for Detecting Leaks in Underground Pipes. David A. Hefferman. (28) Sept., 1918.
Michigan's Largest Hydroelectric Development.* (117) Feb. 15.
Wire-Bag Method of Riprapping Embankment.* L. E. Foster. (Reservoirs.) (117) Feb. 15.
The Measurement of Rainfall and Snow.* Robert E. Horton. (28) Mar.
Cost of Hydroelectric Development.* (27) Mar. 1.
Concrete Box Flume Carried Across Gulch on Trestle.* A. W. Collins. (13) Mar. 6.
Recent Installations of Lang Gates.* Donald C. May. (From *Michigan Technique.*) (86) Mar. 12.
Conditions of Stability and Suggested Design for Wooden Dam Built on Sand. Arthur Surveyor. (Abstract of Report of Quebec Streams Commission.) (86) Mar. 12.
General Factors Affecting the Cost of Constructing Hydro-Electric Development. H. K. Barrows. (Extract from Report of Public Utilities Comm. of Maine.) (86) Mar. 12.
Old-Fashioned Methods Reduce Cost of Dam Repairs.* Charles F. Dingman. (13) Mar. 13.
Influence of Forests on Water Power Supply.* Alfred A. Griffin. (111) Mar. 15.
Recent Multiple Arch Dams.* John S. Eastwood. (111) Mar. 15.
Rotary Screens Remove Dirt from Water at St. Paul.* (13) Mar. 20.

* Illustrated.

Waterways.

Wharf Equipment.* Roy S. MacElwee. (Reprinted from *Ports and Terminal Facilities.*) (100) Nov., 1918.
Coastal and Shore Protection.* H. Colin Campbell. (117) Feb. 15.
Construction of St. Louis Municipal Wharf.* (18) Feb. 22.
The Boston Army Supply Base—Construction Features.* Charles R. Gow. (109) Mar.
The Boston Army Supply Base—General Data. Charles M. Spofford. (109) Mar.
The Brooklyn Army Supply Base.* Harry Gardner. (117) Mar. 1.
Ore Docks, Superior, Wisconsin.* Henry W. Young. (117) Mar. 1.
San Francisco's Protected Beach.* (117) Mar. 1.
The Canal in the Problem of Transportation.* G. P. Gleason. (19) Mar. 15.
Colorado River Flood Control by Storage.* E. C. La Rue. (13) Mar. 6.
Hydraulic Efficiency of a Drainage Ditch for Five Different Channel Conditions.* C. E. Ramser. (13) Mar. 13.
Building a Floating Dry Dock in Well Laid Out Yard.* (13) Mar. 20.
The Miami Conservancy Flood Prevention Plan.* W. A. Drake. (46) Mar. 22.
Sur la Propagation des Crues.* Edmond Maillet. (43) Sept., 1918.
Les Ports français et la Guerre: Calais et Boulogne.* Auguste Pawlowski. (33) Mar. 1.

* Illustrated.